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கொழும்புப் பல்கலைக்கழகம்
UNIVERSITY OF COLOMBO

ANNUAL RESEARCH SYMPOSIUM 2025

**“RESEARCH FOR RESILIENCE – ADVANCING
KNOWLEDGE IN A CHANGING WORLD”**

RESEARCH FOR RESILIENCE

ADVANCING KNOWLEDGE IN A CHANGING WORLD

**PROCEEDINGS OF THE
ANNUAL RESEARCH SYMPOSIUM 2025
UNIVERSITY OF COLOMBO, SRI LANKA**



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OCTOBER 2025



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UNIVERSITY OF COLOMBO, SRI LANKA

OUR MOTTO

“Buddhi Sarvathra Bhrajate”
Wisdom Enlightens

OUR VISION

To be a centre of global excellence in education, research, and stakeholder engagement to enrich human potential for the betterment of society

OUR MISSION

To discover and disseminate knowledge; enhance innovation; and promote a culture of broad inquiry throughout and beyond the university through engagement and collaboration with industry and community

CONTENTS

Organizing Committee	ii
Programme of the Inauguration Ceremony	vii
Message from the Vice-Chancellor	ix
Message from the Symposium Chairperson	x
Introduction to the Chief Guest	xii
Abstract of the Address by the Chief Guest	xiv
Introduction to the Keynote Speaker – I	xv
Abstract of the Keynote Address – I	xvii
Introduction to the Keynote Speaker – II	xix
Abstract of the Keynote Address – II	xxi

PROCEEDINGS

Faculty of Medicine	1
Faculty of Arts	123
Faculty of Science	167
Faculty of Law	211
Faculty of Education	257
Faculty of Graduate Studies	287
Faculty of Management and Finance	307
Faculty of Technology	321
Faculty of Nursing	383
Faculty of Indigenous Medicine	409
The Library	477
Sri Palee Campus	503
Postgraduate Institute of Medicine (PGIM)	521
University of Colombo School of Computing (UCSC)	541
Institute for Agro-Technology and Rural Sciences (UCIARS)	559
National Institute of Library and Information Sciences (NILIS)	593
Institute of Biochemistry, Molecular Biology and Biotechnology (IBMBB) ...	611
Postgraduate Institute of Indigenous Medicine (PGIIM)	645

ANNUAL RESEARCH SYMPOSIUM 2025

UNIVERSITY OF COLOMBO, SRI LANKA

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PROGRAMME OF THE INAUGURATION CEREMONY

New Arts Theater (NAT), University of Colombo
Tuesday, 28th October 2025 at 8.30 am

8.30 am – 9.00 am	Arrival of the Guests
9.00 am – 9.10 am	National Anthem and Lighting of the Oil Lamp
9.10 am – 9.20 am	Welcome Address by Professor Lakmal Weerawarne <i>Chairperson, Annual Research Symposium 2025</i>
9.20 am – 9.30 am	Address by Professor Indika Mahesh Karunathilake <i>Vice-Chancellor, University of Colombo</i>
9.30 am – 9.35 am	Video on Impactful Research of the University of Colombo
9.35 am – 9.45 am	Address by Hon. Dr. Harini Amarasuriya <i>The Prime Minister of the Democratic Socialist Republic of Sri Lanka</i>
	Felicitation of the University Researchers Ranked among the World's Top 2% Scientists and Launching of the Proceedings
9.45 am – 10.15 am	Refreshments
10.15 am – 10.20 am	Pooja Dance
10.20 am – 10.45 am	Address by the Chief Guest <i>Professor Muhammad Iqbal Choudhary</i> <i>Vice President (Central & South Asia), The World Academy of Sciences (TWAS)</i>
10.45 am – 10.50 am	Cultural Performance
10.50 am – 11.15 am	Keynote Address by Professor Gomika Udugamasooriya <i>Professor of Medicinal Chemistry, University of Houston, USA</i>
11.15 am – 11.40 am	Keynote Address by Dr. Sasanka Perera <i>Chairman, Colombo Institute for Human Sciences</i>
11.40 am – 11.50 am	Presentation of Senate Awards for Research
11.50 am – 12.00 pm	Presentation of Plaques
12.00 pm – 12.05 pm	Vote of Thanks by Dr. Thanuja Sooriyagoda <i>Co-Chair, Inauguration Committee</i>
12.05 pm – 12.15 pm	Group Photograph
12.15 pm onwards	Lunch

MESSAGE FROM THE VICE-CHANCELLOR



Professor Indika Mahesh Karunathilake

*Vice-Chancellor, University of Colombo
Sri Lanka*

It is with great pleasure that I extend my warm greetings to all participants of the **Annual Research Symposium 2025** of the University of Colombo, held under the theme “*Research for Resilience – Advancing Knowledge in a Changing World.*”

As the University of Colombo continues its proud tradition as Sri Lanka’s leading seat of learning, the Annual Research Symposium stands as a reaffirmation of our collective mission—to generate, share, and apply knowledge for the advancement of society. The theme chosen for this year resonates deeply with our time, as the world faces rapid transformations driven by climate change, emerging technologies, economic shifts, and evolving social realities.

Resilience has become not only a condition for survival but also a pathway to progress. In this context, research assumes a renewed significance. It equips us to anticipate challenges, innovate with purpose, and craft informed responses that are locally relevant and globally meaningful. Through sustained inquiry and collaboration, universities can act as catalysts for sustainable development and social transformation.

The Annual Research Symposium provides a vital platform for our academic community to showcase its achievements, build new partnerships, and inspire the next generation of researchers. It symbolizes the University’s unwavering commitment to research excellence, interdisciplinary collaboration, and the pursuit of solutions that uplift humanity.

I extend my heartfelt appreciation to all contributors—our dedicated researchers, the organizing committee, and our partners—whose efforts have made this event possible. May this Symposium inspire courageous ideas, meaningful dialogue, and a shared vision for a resilient and knowledge-driven future.

MESSAGE FROM THE SYMPOSIUM CHAIRPERSON



Professor Lakmal Weerawarne

*Chairperson of the Annual Research Symposium 2025
Faculty of Science, University of Colombo
Sri Lanka*

It is with great pleasure that I welcome you to the Annual Research Symposium 2025 of the University of Colombo, held under the theme “*Research for Resilience: Advancing Knowledge in a Changing World.*” This year’s symposium reflects our collective determination to advance research that strengthens communities, informs policy, and nurtures innovation, enabling us to face uncertainty with wisdom, creativity, and courage.

In a world reshaped by climate change, public health crises, economic instability, and technological disruption, resilience is no longer a peripheral idea but the foundation of progress. As a premier seat of learning, the University of Colombo continues to demonstrate how rigorous inquiry and interdisciplinary collaboration can turn complex challenges into opportunities for transformation.

This symposium brings together scholars, professionals, and students from across faculties, institutes, and centres, a vivid reminder that resilience thrives where disciplines intersect. The research shared here showcases the University’s evolving role as both a national and global thought leader, contributing to solutions that matter to people and the planet.

I express my deepest appreciation to the Vice-Chancellor, Professor Indika Mahesh Karunathilake, for his steadfast leadership and encouragement; to the Deans, Directors, and Heads of Departments for their active engagement; and to the tireless organizing committees whose dedication, often beyond official duty, has made this symposium possible. I also extend my heartfelt thanks to our chief guest, keynote speakers, reviewers, and presenters. Your willingness to share knowledge and insight enriches this gathering immeasurably.

Finally, I acknowledge the many students, administrative staff, and technical officers whose unseen efforts form the backbone of this event. Your commitment to excellence reminds us that resilience is not only a research theme but a lived value within our university community. As we celebrate the diversity and depth of scholarship presented here, may we continue to strengthen our shared mission — “To discover and disseminate knowledge; enhance innovation; and promote a culture of broad inquiry throughout and beyond the university through engagement and collaboration with industry and community.”

INTRODUCTION TO THE CHIEF GUEST



H.E. Professor Dr. Muhammad Iqbal Choudhary

Mustafa (PBUH) Prize Laureate, H. I., S. I., T. I.

Vice President (Central & South Asia), The World Academy of Sciences (TWAS)

Coordinator General (OIC-COMSTECH)

*Distinguished National Professor of Bioorganic and Natural Product Chemistry (ICCBS)
Pakistan*

Academician H.E. Professor Dr. Muhammad Iqbal Choudhary is an eminent scientist globally recognized for his outstanding contributions to bioorganic and natural product chemistry, science diplomacy, and capacity building in the developing world. He currently serves as Vice President (Central & South Asia) of The World Academy of Sciences (TWAS), Coordinator General of the OIC Standing Committee on Scientific and Technological Cooperation (OIC-COMSTECH). He also holds the position of Distinguished National Professor and Honorary Advisor at the International Center for Chemical and Biological Sciences (ICCBS), comprising the H. E. J. Research Institute of Chemistry, and the Dr. Panjwani Center for Molecular Medicine and Drug Research at the University of Karachi, and WHO Expert for the Traditional Medicine Research Priority Setting Exercise. He also holds Visiting and Adjunct Professor positions in many reputable international research centers and universities.

A prolific scholar and mentor, Professor Choudhary has authored or edited 94 books, published over 2,100 research papers and book chapters, and holds 94 patents, including 64 U.S. patents. His work has attracted more than 49,000 citations (h-index 89), reflecting his global impact in drug discovery and natural products research. He has supervised over 110 Ph.D. students, and trained hundreds of researchers, particularly from Afro-Asian nations, fostering South–South scientific collaboration, and Middle East countries.

His pioneering discoveries include potent anti-epileptic, anti-leishmanial, and anti-Parkinson compounds, as well as novel antibiotic resistance–reversal agents and cardioprotective natural products. These findings are at various stages of preclinical and clinical trials, demonstrating his leadership in translating natural product chemistry into therapeutic innovation.

Professor Choudhary's international honours are extensive, including the Mustafa (*PBUH*) Prize (2021) — often called the *Nobel Prize of the Muslim World* — the 3rd Sheikh Zayed International Award (2024), the Friendship Award (2022) by the President of China, the ECO Award in Education, and the *Hilal-e-Imtiaz*, *Sitara-e-Imtiaz*, and *Tamgha-e-Imtiaz* by the President of Pakistan. He also serves as UNESCO Chair in Medicinal and Bio-Organic Natural Product Chemistry and Chair of the 2025 Mustafa Prize Scientific Group in Life and Medical Sciences.

In recognition of his lifetime achievements, international institutions have named two research centers after him — the *Iqbal Choudhary Centre for Natural Product Research* in Nigeria and the *Academician Prof. Iqbal Choudhary Research Center* at Hunan University of Medical Science, China.

A fellow of several prestigious academies — including TWAS, the Islamic World Academy of Sciences, the Royal Society of Chemistry (London), and the Pakistan Academy of Sciences — Professor Choudhary stands as a powerful advocate for scientific excellence, innovation, and collaboration across the Global South.

ABSTRACT OF THE ADDRESS BY THE CHIEF GUEST

H.E. Professor Dr. Muhammad Iqbal Choudhary

*Mustafa (PBUH) Prize Laureate, H. I., S. I., T. I.
Vice President (Central & South Asia), The World Academy of Sciences (TWAS)
Coordinator General, OIC-COMSTECH*

In my address I will reflect on the power of knowledge as the true foundation of resilience in a rapidly changing world. Humanity faces converging crises—climate instability, pandemics, resource depletion, technological disruption, and social fragmentation—where progress depends not on chance, but on the deliberate cultivation of scientific inquiry, collaboration, and shared human values.

Knowledge empowers societies to adapt, innovate, and thrive. To quote Nelson Mandela, “Education is the most powerful weapon to change the world”. The World Academy of Sciences (TWAS) fosters research collaboration, training fellowships, and technology-transfer programmes across the Global South, enabling even small institutions to contribute to collective problem-solving. I wish to highlight Sri Lanka’s growing partnerships with TWAS in climate adaptation, health research, and technology-enabled education and emphasize that there is a need of unleashing the creative potential of Sri Lankan youth in coordinated, and sustained programmes.

Turning to the Fourth Industrial Revolution, artificial intelligence, biotechnology, nanoscience, and clean-energy technologies hold unprecedented promise—but only when guided by ethics, equity, and compassion. Innovation without human purpose, cannot build resilience. True strength arises not only in laboratories but also in classrooms, lecture halls, and research groups that nurture curiosity and integrity among youth.

Students should see themselves as architects of tomorrow, where success will rest on their capacity to learn, adapt, and collaborate. I would like to call for stronger South-Asian cooperation to build a regional scientific ecosystem promoting peace, prosperity, and sustainability. In conclusion, I wish to remind you that the pursuit of knowledge is both a moral responsibility and a sacred trust—uniting intellect and humanity in service to the betterment of all.

INTRODUCTION TO THE KEYNOTE SPEAKER – I



Professor Gomika Udugamasooriya

Professor of Medicinal Chemistry, University of Houston, USA

Adjunct Professor, University of Texas MD Anderson Cancer Center

Adjunct Member, Dan L. Duncan Comprehensive Cancer Center, Baylor College of Medicine

Senior Member, National Academy of Inventors (USA)

Senior Advisor on Science and Technology to the President of Sri Lanka

Professor Gomika Udugamasooriya is a leading scientist in the fields of medicinal chemistry, chemical biology, and molecular therapeutics, with a strong focus on the discovery of novel agents for cancer diagnosis and treatment. He serves as Professor of Medicinal Chemistry in the Department of Pharmacological and Pharmaceutical Sciences at the University of Houston, where he leads a multidisciplinary research programme on peptoids, peptidomimetics, and ligand discovery platforms for “undruggable” disease targets.

He also holds adjunct appointments at the University of Texas MD Anderson Cancer Center and the Dan L. Duncan Comprehensive Cancer Center at Baylor College of Medicine, reflecting his strong collaborative ties across major research institutions in the United States. His work has led to the identification of cancer stem cell biomarkers, selective inhibitors for kinase signaling, and novel anti-viral and anti-cancer ligands with significant translational potential.

Professor Udugamasooriya’s contributions have been recognized through numerous awards, including the Faculty Excellence in Research Award from the University of Houston, NIH SPORC Career Development Award, and the UT-Metroplex Science Award. He has been honoured as a 50-in-5 Scholar for outstanding research productivity and innovation, and elected as a senior member of the National Academy of Inventors (USA) in recognition of his contributions to science, innovation, and intellectual property.

He obtained his Ph.D. in Bioorganic Chemistry and Biochemistry from Wayne State University, USA, followed by postdoctoral research at the University of Texas Southwestern Medical Center, where he began developing his expertise in combinatorial chemistry and

peptide-based drug discovery. He earned his B.Sc. (Special) in Chemistry from the University of Colombo, Sri Lanka.

In addition to his academic achievements, Professor Udugamasooriya serves as Senior Advisor on Science and Technology to the President of Sri Lanka, contributing to national policy development, international research collaboration, and technology-driven innovation initiatives. His career embodies a commitment to advancing global scientific excellence while strengthening research capacity in Sri Lanka and beyond.

ABSTRACT OF THE KEYNOTE ADDRESS – I

Transforming Sri Lanka through Research and Development (R&D): Harnessing the Best out of the Most Creative Human Resource we have

Professor Gomika Udugamasooriya

Professor of Medicinal Chemistry, University of Houston, USA

Due to the inadequate appreciation of the role of R&D in national development so far, the research developments have not significantly contributed to economic and social development, as has been happening in developed countries. Despite valiant efforts by individual researchers, with no research prioritization for national needs at the front end, and also no competent mechanism for research commercialization at the back end, their efforts were sadly being left out of the country's development equation. Furthermore, the deficiencies in collaboration among R&D stakeholders such as government authorities, research institutions, universities and the public, as well as low participation of the private sector in research activities, have further exacerbated the R&D efforts in Sri Lanka. Sri Lanka currently allocates only 0.12% of GDP to R&D—dramatically below regional peers like Malaysia at 1% and Thailand at 1.2%. This underinvestment has created a fragmented ecosystem coupled with poor R&D ecosystem management, limited commercialization, and significant brain drain. Despite our rich natural resources, endemic biodiversity, deep indigenous knowledge systems, and most importantly having highly intelligent human resource, we have failed to harness these assets for economic and societal transformation of R&D outcomes.

Understanding all these weaknesses and bottlenecks, the current government has finalized a well-thought-out R&D policy. We are establishing a centralized yet collaborative framework through two key mechanisms: establishment of the National Institute for Research and Development (NIRD) and the National Council for Research and Development (NCRD). This structure will coordinate eight strategic thematic groups—from energy and technology to agriculture and social sciences—ensuring alignment with national priorities. What sets Sri Lanka apart is our new government's commitment to integrating traditional knowledge with cutting-edge science. We are not just copying global models—we are creating a uniquely Sri Lankan approach that harness the power of our indigenous wisdom while embracing international collaboration. Our policy prioritizes equity, transparency, and environmental sustainability, ensuring research benefits reach every citizen.

Through strategic partnerships, enhanced collaborations amongst Sri Lankan universities, research institutes, investors, industrialists, and expatriates' engagements, with robust intellectual property protection, we are creating an innovation ecosystem that transforms natural resources into value-added products. We are fostering student-centered R&D experiences from early education, reversing brain drain, and building research infrastructure

that attracts global investment. Finally, we are creating an “investor-friendly” and “politically cleaner” atmosphere in Sri Lanka and invite international partners to join this transformation. Sri Lanka offers unique biodiversity, strategic location, and now—a comprehensive policy framework ready for collaboration. Together, we can demonstrate how a small nation like Sri Lanka can achieve extraordinary scientific breakthroughs with the establishment of effective management and supportive systems, harnessing the best out of the most creative human resource we have.

INTRODUCTION TO THE KEYNOTE SPEAKER – II



Dr. Sasanka Perera

*Chairman, Colombo Institute for Human Sciences
Sri Lanka*

Dr. Sasanka Perera is a distinguished Sri Lankan cultural anthropologist whose work bridges the humanities and the social sciences with a rare sensitivity to culture, politics, and everyday life. He is currently the Chairman of the Colombo Institute for Human Sciences and holds honorary directorships at the Centre for Poverty Alternatives and Tambapanni Academic Publishers.

Dr. Perera served as Professor of Sociology at the South Asian University in New Delhi from 2011 to 2024, where he also held key leadership positions including Vice President, Dean of the Faculty of Social Sciences, and Chairman of the Department of Sociology. Before moving to New Delhi, he spent nearly two decades at the University of Colombo, where he nurtured generations of sociologists as Senior Lecturer, Professor, and Head of Department.

Educated at the University of California, Santa Barbara (Ph.D. and M.A. in Anthropology) and the University of Colombo (B.A. in Political Science, Sociology, and English Literature), Dr. Perera also holds advanced diplomas in Conflict Resolution (Uppsala University, Sweden) and International Affairs (Bandaranaike Centre for International Studies).

His extensive scholarship examines political violence, memory, nationalism, urban life, the politics of culture, religion, education, and visual arts in South Asia. He has authored and edited over fifteen books in English and Sinhala, including *Fear of the Visual?* (2020), *Warzone Tourism in Sri Lanka* (2016), and *Violence and the Burden of Memory* (2015). His writings have been translated into Tamil, Japanese, and Spanish, and his research has taken him across Sri Lanka, India, Nepal, Pakistan, Cambodia, Japan, Bhutan, and the United States.

A recipient of Sri Lanka's State Literary Awards (2023) for the best translation of a play and of poetry, Dr. Perera is also an accomplished poet and translator, with several Sinhala poetry collections to his credit, including *Let Us be Silent* (2025). He has held visiting fellowships in

Japan, India, and Sweden, and is a life member of the Indian Sociological Association, the Royal Asiatic Society of Sri Lanka, and the Sri Lanka Association for the Advancement of Science.

With his deep engagement in art, music, and journalism, Dr. Perera continues to offer a compelling voice on how societies remember, heal, and transform—making him one of South Asia’s foremost thinkers on culture and resilience.

ABSTRACT OF THE KEYNOTE ADDRESS – II

Social Sciences and Humanities: Does Sri Lanka Contribute to the Global Intellectual Expansion of Disciplines?

Dr. Sasanka Perera

*Chairman, Colombo Institute for Human Sciences
Sri Lanka*

From my own location within social sciences, this lecture will briefly pose two broad, but fundamental questions on the intellectual personality of both social sciences and humanities as they manifest in Sri Lanka. These are questions I have been raising in Sri Lanka and elsewhere in South Asia for well over two decades, often receiving very different responses. The first question is whether the research produced in Sri Lanka in these disciplines make an impact on the corresponding global or regional discourses? For example, does Sri Lankan sociology, political science, literature, cultural studies and so on make a difference in the ways in which these disciplines work and think elsewhere in the world? The second question is to what extent theory and philosophy produced by social sciences and humanities in Sri Lanka has impacted global discourses? Again, to simplify matters, have Sri Lankan social sciences and humanities taken a lead at any time in the intellectual histories of the world in theorizing these disciplines more broadly as have bodies of knowledge that range from Marxism to Structuralism to Poststructuralism, all of which emanated from the ‘West’ at different historical times which we have embraced without much reflection? But it is not the intention of this talk to answer these questions. Instead, the lecture will attempt to place several related issues in context and let the listeners think through the question and evidence at hand and make up their own minds.

FACULTY OF MEDICINE



*Shaping the Future Doctor through Education, Research and
Innovation*

The Colombo Medical Congress (CMC) 2025

25th – 28th November 2025

MESSAGE FROM THE DEAN

Vidya Jyothi Professor Vajira H. W. Dissanayake

*Chair and Senior Professor of Anatomy
Genetics and Biomedical Informatics
Faculty of Medicine
University of Colombo
Sri Lanka*



It is with great pleasure that I extend my warmest greetings to all participants of the Annual Research Symposium 2025 of the University of Colombo. This year's theme, "*Research for Resilience: Advancing Knowledge in a Changing World*," is both timely and deeply relevant. As we navigate a world shaped by rapid technological, social, and environmental change, the role of research in building resilience — at the level of individuals, communities, and nations — has never been more critical.

At the Faculty of Medicine, we are proud to contribute to this mission through our wide-ranging research endeavours. I would particularly like to highlight the pioneering work of the **Centre for Meditation Research**, which embodies the theme of resilience in a unique way. Rooted in the rich traditions of mindfulness and contemplative practice, yet firmly grounded in scientific inquiry, the Centre explores how meditation strengthens mental, emotional, and physical well-being. Its research spans neuroscience, psychology, and clinical medicine, providing evidence of meditation's role in reducing stress, enhancing coping strategies, and fostering holistic health.

In a time when resilience is tested by challenges such as climate change, global health crises, and social upheaval, the work of the Centre reminds us that resilience is not only external but also internal. By advancing knowledge on how inner strength can be cultivated and sustained, it contributes to healthier individuals, stronger communities, and a more compassionate world.

I commend all researchers whose work is showcased at this symposium, and I encourage you to continue pursuing knowledge that uplifts humanity in these times of change.

MESSAGE FROM THE ACADEMIC CO-CHAIRS



Dr. Maduka de Lanerolle Dias

*Department of Biochemistry and Molecular
Biology
Faculty of Medicine
University of Colombo, Sri Lanka*



Professor Eranga Wijewickrama

*Department of Clinical Medicine
Faculty of Medicine
University of Colombo, Sri Lanka*

The Annual Research Symposium 2025 of the University of Colombo, “Research for Resilience: Advancing Knowledge in a Changing World”, reflects the vital role of research in addressing complex challenges and building a resilient society.

We are delighted to be a part of this experience, which brings together researchers, educators, and students to share insights, foster collaboration, and inspire innovation. We hope this symposium sparks meaningful discussions, strengthens academic networks, and motivates all participants to continue advancing knowledge for the benefit of our communities and beyond.

We wish you an engaging and rewarding experience.

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SYMPOSIUM PROGRAMME

25th November 2025 – Pre Congress

8.00 am – 8.45 am: Registration				
9.00 am – 10.30 am	Planetary Health Symposium	Nature-Inspired Neuroprotection	Eye in the Digital Era	25 Years of Graduate Pharmacy Education and Beyond
10.30 am – 11.00 am: Morning Snack				Pharmacology symposium
11.00 am – 12.30 pm	Climate Change and NEXTGEN	Mindful Workplaces: Cultivating presence, compassion and well-being for institutional sustainability	Use of Gastrointestinal Physiology Investigations in diagnosis	
12.30 pm – 1.30 pm: Afternoon snack				
1.30 pm – 3.30 pm	Planetary Health hackathon	Art based expressions on the ritualistic healing culture of Sri Lanka on ‘sanni masks’		
3.30 pm – 4.00 pm: Evening Snack				

26th November 2025 – Main Congress

8.00 am – 8.45 am	Registration
9.00 am – 9.10 am	Academic Procession
9.10 am – 9.20 am	National Anthem & Faculty Song
9.20 am – 9.30 am	Lighting of the Oil Lamp
9.30 am – 9.45 am	Welcome Address <i>Vidya Jyothi Prof. Vajira H. W. Dissanayake</i> <i>Dean, Faculty of Medicine, University of Colombo</i>
9.45 am – 9.55 am	Introduction to Scientific Sessions by the Academic Chairspersons <i>Dr. Maduka de Lanerolle Dias & Prof. Eranga Wijewickrama</i>
9.55 am – 10.05 am	Address by CoMSAA President <i>Prof. Ishan de Zyosa</i>
10.05 am – 10.15 am	Address by the Vice-Chancellor, University of Colombo <i>Prof. Indika Karunathilaka</i>
10.15 am – 10.45 am	Keynote Address <i>Dr. Muditha Darshana Senarath-Yapa</i> <i>Chief Innovation Officer</i> <i>National Innovation Agency</i>
10.45 am – 10.50 am	Address by the Chief Guest <i>Prof. Chrishantha Abeysena</i> <i>Minister of Science and Technology</i>
10.50 am – 11.30 am	Faculty Oration: Empowering Public Health: The Critical Role of Viral Diagnostics in Disease Control, Elimination and Eradication Efforts <i>Dr. M. A. Y. Fernando</i> <i>Lecturer and Specialist in Virology, Department of Medical Microbiology and Immunology, Faculty of Medicine, University of Colombo</i>
11.30 am – 11.40 am	Vote of Thanks <i>Dr. Dilusha Fernando</i> <i>Secretary CMC</i>
11.40 am – 12.00 pm	Cultural Event
12.00 pm – 1.00 pm	Reception
1.00 pm – 2.30 pm	Session: Pearls in Geriatric Medicine
2.30 pm – 4.00 pm	Session: Will AI Replace Doctors?
5.00 pm	Evening Snack

27th November 2025 – Main Congress

8.00 am – 8.45 am	Registration
9.00 am – 10.30 am	Session: Translating Evidence to Action: Enhancing Diet Quality for Optimal Nutrition
10.30 am – 11.00 am	Morning Snack
11.00 am – 12.30 pm	Free Paper Sessions
12.30 pm – 1.30 pm	Afternoon Snack
1.30 pm – 3.00 pm	Session: Medical Humanities
3.00 pm – 5.00 pm	Closing Ceremony CoMSAA Oration

28th November 2025 – Post Congress

8.00 am – 8.45 am	Registration
9.00 am – 4.00 pm	<i>Non Academic Day 2025 “Empowering Membership: Improving Career Growth and Efficiency”</i>

INTRODUCTION TO THE KEYNOTE SPEAKER

Dr. Muditha Darshana Senarath-Yapa

*Chief Innovation Officer
National Innovation Agency
Sri Lanka*



Dr. Muditha D. Senarath-Yapa is a distinguished scientist with an impressive academic and professional background. A student of Royal College, Colombo, he pursued higher education at the University of Peradeniya, Sri Lanka, earning a Chemistry Special degree with first-class honours. He then proceeded to the United States to continue his studies, obtaining a Ph.D. in Analytical Chemistry from the University of Arizona, Tucson. Following his doctoral studies, Dr. Senarath-Yapa engaged in two years of postdoctoral research at the Art Conservation Research Center of Carnegie Mellon University in Pittsburgh, Pennsylvania. He subsequently held positions at Carnegie Mellon University and the Sri Lanka Institute of Nanotechnology (SLINTEC), where he served as an assistant scientist (ACRC-CMU) and later as a senior scientist and business development manager.

In December 2012, Dr. Senarath-Yapa was recruited by John Keells Holdings to establish John Keells Research (JKR), the innovation arm of the conglomerate. As the head of research, he led the organization for nearly a decade, focusing on the application of science and technology to foster the development of future technologies. His Ph.D. and subsequent work have prominently featured the application of science in product and service development.

Currently, Dr. Senarath-Yapa operates as Director General of National Initiative for Research and Development Commercialization (NIRDC) and the Chief Innovation Officer of National Innovation Agency (NIA). He also serves on NASTEC Board as a member and on the technical committee of NARA. Additionally, he serves on the SLINTEC Board of Directors. He is continuing his dedication to leveraging scientific expertise for practical and commercial advancement.

As Chief Innovation Officer, he plays a pivotal role in shaping Sri Lanka's innovation landscape, fostering collaboration across stakeholders, and ensuring that science and technology serve as engines for sustainable socio-economic development.

ABSTRACT OF THE KEYNOTE ADDRESS

Shaping the Future Doctor through Education, Research and Innovation

Dr. Muditha Darshana Senarath-Yapa

Chief Innovation Officer

National Innovation Agency, Sri Lanka

Throughout history, medical education has evolved through critical inflection points that demanded fundamental innovation and reform. The "black death of childbed" (puerperal sepsis) in the 19th century exposed gaps in antiseptic understanding, catalyzing evidence-based practice integration. The COVID-19 pandemic similarly forced rapid adoption of virtual learning, telemedicine training, and flexible curricula delivery. Today, we stand at another pivotal moment: the AI revolution represents the next major inflection point requiring transformative approaches to medical education.

This presentation explores how these historical lessons inform our multifaceted approach to shaping tomorrow's doctors through progressive education, cutting-edge research, and innovative methodologies. Modern medical education must transcend traditional boundaries, integrating AI-enhanced learning, simulation platforms, and competency-based curricula that prepare physicians for an increasingly complex healthcare landscape.

The future physician requires not only clinical expertise but also proficiency in AI-assisted diagnostics, machine learning applications, and algorithm-informed decision-making. Just as Semmelweis's hand hygiene innovations revolutionized infection control education, and COVID-19 accelerated digital learning adoption, the AI revolution demands fundamental curriculum restructuring. Educational institutions must prepare students to work alongside intelligent systems while maintaining clinical reasoning, ethical judgment, and the humanistic core of medical practice.

Innovation serves as the catalyst for educational transformation at each inflection point. Artificial intelligence now enables personalized learning pathways, predictive analytics for student performance, and sophisticated clinical decision support training. Virtual reality platforms provide immersive experiences, while AI-powered simulation adapts to individual learning needs.

Research integration throughout medical training cultivates evidence-based thinking essential for navigating future inflection points. Students must understand AI algorithms, validate machine learning outputs, and contribute to advancing medical knowledge through human-AI collaboration.

By learning from historical inflection points and proactively addressing the AI revolution, we can prepare physicians who will not merely adapt to future healthcare challenges but actively shape solutions for improved patient outcomes and global health equity.

LIST OF ABSTRACTS

Evaluation of the antioxidant activity of the six selected herbal teas used in Sri Lanka <i>K. M. N. P. Kumari, K. Siridewa</i>	20
Association of Alpha-1-Acid Glycoprotein (AGP) with hsCRP: A marker of chronic inflammation and pro-inflammatory diet in adult women in the US <i>K. B. M. Kavirathne, P. Lanerolle, I. Waidyatilaka, M. De Lanerolle Dias</i>	21
Comparative evaluation of antimicrobial activity of peel extracts from five Sri Lankan banana varieties <i>A. C. H. Elaphatha, M. K. Ediriweera, S. M. T. Jayasena, Y. W. S. Suranadee</i>	22
Prevalence and risk factors associated with <i>Enterobius vermicularis</i> infection among 3 to 10-year-old children in the Halpathota Central Grama Niladari Division of Baddegama, Galle District, Sri Lanka <i>P. V. E. H. Goonawardhana, P. K. S. Geethika, G. Ghamshayeni, K. M. K. C. Gunaratne, S. Gunawardena</i>	23
Association of lifestyle and reproductive factors with age at natural menopause among postmenopausal women in Gampaha District <i>K. G. D. S. Premasinghe, P. H. D. N. Punchihewa, R. D. T. Rajamanthri, R. W. V. N. A. Rajapaksha, P. M. Atapattu</i>	24
Occupational morbidities and their association with preventive practices among salt pan workers in Hambantota District, Sri Lanka <i>G. H. Lakmal, U. G. I. K. Kumarasiri, M. P. R. Lakpriya, N. P. Kumarasena, C. Arambepola</i>	25
Development of a novel simulated wound exudate using gelatine <i>H. M. Shafqat, A. C. Elaphatha, S. M. T. Jayasena</i>	26
Leisure Reading habits and user-centered recommendations from medical undergraduates: Insights from a Sri Lankan medical library <i>K. K. N. L. Perera, C. Liyanage, R. M. T. N. Rajapaksha, C. Weeraratne, D. C. Kuruppu, D. B. L. Samaranayake</i>	27
Functional mobility, self-efficacy, and their impact on health-related quality of life among residents of selected elderly homes in the Kurunegala District <i>M. I. F. Amani, A. H. Wettasinghe</i>	28
Relationship of kinesiphobia with functional disability and quality of life in patients with chronic non-specific low back pain attending two selected hospitals in Colombo District <i>J. U. Gunawardhana, G. G. Ponnampereuma</i>	29
Knowledge, attitudes, practices and associated factors regarding CSE among teachers of adolescents in the Kurunegala education division <i>M. F. F. Shahidha, M. Saraneekaran, V. S. S. Abeywickrama, J. A. H. V. Sandanayake, I. Karunathilake</i>	30

Water turnover by deuterium dilution in adult males <i>B. Sewwandi, M. De Lanerolle Dias, I. Waidyatilaka, P. Lanerolle</i>	31
Religious, spiritual practices and its association with mental health in middle-aged schoolteachers in Colombo, Sri Lanka <i>M. Wijesinghe, C. Wijesinghe, R. Wijesinghe, P. Wijesinghe, A. Gallage</i>	32
Association of overweight and obesity with genu valgum and genu varum among 10–19-year-old female students in selected schools in Gampaha District <i>B. D. R. N. Perera, S. S. Y. Withanage</i>	33
Knowledge and factors associated with knowledge regarding basic life support among undergraduates in the science faculty of a selected state university in Colombo District <i>R. S. Hameem, M. R. F. Reema, M. A. D. Rinoshika, S. N. D. Rosa, D. M. S. Jayawardena</i>	34
Knowledge and practices of usage of paracetamol as an over-the-counter medicine among adult patients attending a selected hospital setting <i>L. P. T. D. Wijetunga, M. R. F. Sahna, K. M. Wijesooriya, A. Y. Anuththara, S. D. Amarasuriya</i>	35
Association between digital device usage and cognitive development among primary school children in grades 3 and 4 in Sri Jayewardenepura educational zone <i>T. S. S. Dissanayake, M. T. Diwakara, S. K. Edirisinghe, S. H. Elvitigala, W. Hathagoda</i>	36
Efficacy and safety of herbal therapies in the treatment of hyperlipidemia: A systematic review of randomized controlled trials <i>R. M. T. N. Rajapakshe, W. M. P. C. Weerasekara, P. Ranasinghe</i>	37
Association between body mass index, stress, and physical activity levels among bank officers in selected banks in Colombo District, Sri Lanka <i>K. H. N. De Silva, P. W. P. Chathurangana</i>	38
Exploring indications and findings: A two-year experience in paediatric upper gastrointestinal endoscopy <i>W. Hathagoda, A. Jayapathum, S. Rajindrajith</i>	39
Impact of donor type on short-term renal transplant outcomes in a tertiary center <i>P. H. R. S. Mendis, J. Arudchelvam, D. S. Palihakkara, T. Gooneratne, R. Cassim, M. Wijeyratne</i>	40
Perceptions, behaviours and challenges in health-seeking among blind graduates and undergraduates registered at a specific Disabled Persons Organization (DPO) in Sri Lanka <i>G. H. D. Ranjuka, M. M. T. R. Rathnasiri, A. V. S. Ratnatilleke, M. R. L. Rauff, D. M. S. Jayawardena</i>	41
Long-term outcomes of liver transplantation: A single-centre experience in Sri Lanka <i>J. Arudchelvam, D. Palihakkara, R. Mendis, B. Jayawickrama, R. Cassim, M. Wijeyratne.....</i>	42

Comparison of body image and self-esteem between Yoga and Zumba practitioners of 20-40 years in selected Yoga and Zumba classes in Colombo District <i>D. K. Amarathunga, G. Ponnampuruma</i>	43
Exploring functional skills and their correlates in children with Down syndrome: A study from Colombo District, Sri Lanka <i>K. A. R. B. Kasthuriarachchi, U. Liyanage</i>	44
Career outcomes and professional pathways of medical graduates: Evidence from the Faculty of Medicine, University of Colombo <i>J. A. I. Gunasekara, C. Liyanage, L. Wanninayake, P. Yasawardene, T. Perera, W. A. G. Wickramasinghe, A. de Abrew, I. Karunathilaka, P. Ranasinghe</i>	45
The relationship between anterior pelvic tilt and pregnancy-related low back pain among pregnant women during their third trimester attending selected government maternity hospitals in the Colombo District <i>A. C. Weerasinghe, I. A. Jayawardane</i>	46
Clinical profile and outcomes of pancreatic fluid collections managed via endoscopic drainage in a tertiary care centre in Sri Lanka <i>D. Safeer, N. Fernandopulle</i>	47
Comparison of static balance and core endurance between female undergraduate Ballet dancers and Kandyan dancers <i>A. G. S. H. Perera, D. W. N. Dissanayake</i>	48
Knowledge and use of dietary supplements among gym-goers from Colombo District <i>S. Thuyacontha, O. Thuduwege, P. Tshomo, S. Tshomo, S. De Silva Welianage</i>	49
Non-Communicable Diseases, cardiovascular risk and factors associated with cardiovascular risk among adults attending a rural hospital in Northern Sri Lanka <i>M. N. Perera, D. M. S. Jayawardene</i>	50
A rapid and feasible method for detecting pathogenic <i>BRCA1/2</i> variants in breast cancer patients <i>K. Rajan, K. W. Gunawardena, N. D. Sirisena, V. H. W. Dissanayake</i>	51
A preliminary attempt to analyze the gene expression of DNA polymerases in bladder cancer <i>R. M. Kamal, M. K. Ediriweera, A. P. Malalasekara, M. Wijewardena, B. Sathesan</i>	52
Prevalence and risk factors of neck and shoulder pain among G.C.E. Ordinary Level (O/L) students in two selected schools in Batticaloa District, Sri Lanka <i>M. B. F. Nisfa, C. Liyanage</i>	53
Association between musculoskeletal pain and health-related quality of life among male stone quarry workers in Kaduwela Municipal area Colombo District, Sri Lanka <i>M. K. H. P. Senarath, A. H. Wettasinghe</i>	54

A pilot study on the evaluation of the genotoxic effects of betel quid on human buccal cells using the DNA comet assay in a Sri Lankan cohort <i>G. S. C. Prabhashani, C. Udukumbura, H. W. Dilanthi, M. D. M. Fernando</i>	55
Development of laboratory protocols for detecting epigenetic variants TET2 c.4210C>T (Arg1404Ter) and TET2c.822del (Asn275fs) and study their prevalence in a Sri Lankan Myeloproliferative Neoplasm cohort <i>W. P. U. S. Weerasinghe, S. T. Karunathilake, N. N. H. Costha, N. Amarasinghe, Y. J. Costa, H. W. W. Goonasekera</i>	56
Prevalence and genotype-phenotype correlation study of ASXL1 variants c.1773C>G(Tyr591Ter) and c.1282C>Tp.(Gln428Ter) in a Sri Lankan Myeloproliferative Neoplasm cohort <i>S. T. Manamperi, S. T. Karunatilake, N. N. H. Costha, N. Amarasinghe, Y. J. Costa, H. W. W. Goonasekara</i>	57
The socio-economic determinants of food choices and dietary habits among adolescents in urban Sri Lanka: A cross-sectional study <i>C. Gamachchige, M. Fonseka, O. Fonseka, D. Gamage, N. Chandraratne</i>	58
The association of nutritional knowledge with food choices and dietary habits of adolescents in urban Sri Lanka <i>D. Gamage, C. Gamachchige, M. Fonseka, O. Fonseka, N. Chandraratne</i>	59
Assessment of the medication safety practice package developed and implemented among pharmacists in a tertiary care hospital <i>G. R. W. S. K. Bandara, P. Galappaththy, S. Kiriwandeniya, N. Samaranayake</i>	60
Knowledge and practices on screen time use and the association between screen time use and social intelligence of G.C.E. Advanced Level students of selected boys' schools in the Colombo District <i>M. P. M. Perera, M. P. J. Perera, M. I. S. D. Perera, A. de Abrew</i>	61
Emotional intelligence, empathy and their associations among medical undergraduates in Sri Lanka <i>D. R. Hemasinghe, H. A. N. Hansika, H. P. P. D. Heiyanthuduwa, G. Ponnampuruma</i>	62
The influence of balance ability on prosthetic mobility and social activity among individuals with a unilateral lower extremity amputation attending to Colombo Friend in Need Society <i>P. P. Chamika, D. G. S. K. L. Jayawardana</i>	63
Estimation of postmortem interval using vitreous humor electrolyte concentrations in natural deaths within Sri Lankan population <i>Y. Mulleriyawa, M. S. K. Rabindrakumar, K. M. Mulleriyawa, N. A. Mendis</i>	64
A descriptive study of the genetic basis of rare undiagnosed disorders in a cohort of Sri Lankan patients <i>D. Hettiarachchi, H. G. C. K. Samarasoorya, D. P. B. Hendalage, N. F. Neththikumara, G. B. M. Adeshika, T. K. Wetthasinghe, H. W. W. Goonasekera, N. D. Sirisena, V. H. W. Dissanayake</i>	65

Association of upper limb lymphedema with handgrip strength, balance, and gait mobility in women following mastectomy: A cross-sectional study at the National Cancer Institute, Sri Lanka <i>K. D. Wijesinghe, D. G. S. K. L. Jayawardane</i>	66
Self-reported prevalence and risk factors associated with low back pain among male university athletes in the Colombo District <i>M. L. R. K. Fonseka, S. Weerasinghe</i>	67
Prevalence of musculoskeletal pain and its association with body mass index and physical activity level among patients with type 2 diabetes mellitus at the National Hospital of Sri Lanka <i>C. D. Ranneththige, H. D. Wijesinghe</i>	68
Development and validation of a population-specific prediction equation for total body water using deuterium dilution in adult males living in Colombo District <i>M. F. A. Ahamed, P. Lanerolle, M. de Lanerolle Dias, I. Waidyatilaka</i>	69
Health-related quality of life and physical activity of the patients with bronchiectasis: A cross-sectional descriptive study at Central Chest Clinic, Colombo and National Hospital for Respiratory Diseases, Welisara <i>L. R. De Silva, C. M. A. Anthony</i>	70
Relationship between hip joint active range of motion and spatiotemporal parameters of gait in patients with non-specific low back pain attending the Rheumatology and Rehabilitation Clinic at the National Hospital of Sri Lanka <i>K. G. N. M. Kariyawasam, C. M. A. Anthony</i>	71
Association of diabetic peripheral neuropathy with lower limb muscle strength and the ankle range of motion of patients who attend diabetic clinics at the National Hospital of Sri Lanka <i>U. M. Wickramarachchi, D. W. N. Dissanayake</i>	72
Prevalence and associated factors for heel pain among housewives attending MOH clinics in selected MOH divisions in Colombo District, Sri Lanka <i>D. M. D. T. Bandara, J. L. R. Jayalath</i>	73
Knowledge and the prevalence of risk factors of Polycystic Ovarian Syndrome (PCOS) among the students at the university of Sri Jayewardenepura <i>G. S. H. Perera, D. S. Palihakkara, V. C. Pathiraja, N. Senanayake</i>	74
High prevalence of the PDE8B rs4704397 (G>A) risk allele in a cohort of normal and overweight/obese Sri Lankan young women <i>D. Pussella, M. S. K. Rabindrakumar, U. Branavan</i>	75
Awareness on autism spectrum disorder among primary caregivers of children aged 5 or less, attending child welfare clinics in Battaramulla MOH area <i>J. F. Ranaa, S. S. Ranasingha, C. D. Ranasinghe, R. H. S. S. Ranasinghe, K. K. Vithanage</i> ...	76

Integrating AI to medical education: Readiness, knowledge and expectations of pre-clinical academics of the Faculty of Medicine, University of Colombo <i>N. Dharmarathne, R. Hewapathirana, P. Siribaddana</i>	77
Association between <i>BRCA1</i> promoter methylation in peripheral blood DNA and sporadic breast cancer risk in postmenopausal women <i>K. Krishnasamy, N. N. H. Costha, N. D. Sirisena</i>	78
Association between demographic factors and occupational stress among physiotherapists in government hospitals, Colombo District, Sri Lanka <i>C. Manamperi, P. Herath</i>	79
Prevalence, associated factors, and treatment-seeking behaviour related to musculoskeletal (MSK) pain among university-level cricketers in selected state universities in Western Province <i>M. Dilakshan, D. Samaranayake</i>	80
Relationship between handgrip strength and fear of falls among older adults in selected elderly homes in Kalutara District, Sri Lanka <i>A. I. M. Waidyarathne, S. S. Y. Withanage</i>	81
Prevalence and contributing factors of musculoskeletal discomfort among operation theatre nurses in the National Hospital, Sri Lanka <i>B. K. S. Nisansala, P. W. P. Chathurangana</i>	82
The role of a selected group of healthcare providers as a source of health information: A primary study <i>A. R. R. Ramzath, Y. D. Siriwardana</i>	83
Impact of knee osteoarthritis complications on quality of life in older adults attending the National Hospital of Sri Lanka <i>N. T. K. Arachchige, A. H. Wettasinghe</i>	84
Parents'/guardians' knowledge and attitudes regarding physiotherapy in the rehabilitation of children with Cerebral Palsy (CP) and their caregiver burden: A cross-sectional descriptive study at the Lady Ridgeway Hospital, Colombo <i>R. S. Weerathunga, C. Liyanage</i>	85
A study on the pattern of injuries admitted to the accident and emergency service, National Hospital of Sri Lanka <i>G. Panchadcharam, J. Arudchelvam</i>	86
A single-surgeon experience of cadaveric organ retrieval: A retrospective review <i>J. Arudchelvam, P. H. R. S. Mendis, D. S. Palihakkara</i>	87
Assessing the relationship between body mass index, dynamic balance, and pain intensity in patients with chronic low back pain attending selected hospitals in the Colombo District <i>M. Umama, A. Wettasinghe</i>	88

Comparison of upper limb muscle strength, lower limb muscle strength and quality of life of older adults who practice yoga and do not practice yoga in selected settings in Colombo District <i>A. M. D. Lakmali, C. Ranasinghe</i>	89
Role of rPagSP02 and rPagSP06 salivary biomarkers of <i>Phlebotomus argentipes</i> in measuring vector exposure in Sri Lanka <i>S. B. Piyasiri, S. A. S. C. Senanayake, T. N. Samaranayake, S. Doh, E. Iniguez, J. G. Valenzuela, S. Kamhawi, N. D. Karunaweera</i>	90
Relationship between physical performance and quadriceps muscle strength of the patients with knee osteoarthritis attending the Rheumatology and Rehabilitation clinics in the National Hospital of Sri Lanka <i>K. M. U. I. Bandara, I. Atukorala</i>	91
Comparative evaluation of antioxidant activity in flower and leaf extracts of <i>Tagetes lemmonii</i> assessed by DPPH radical scavenging method <i>W. A. J. Perera, S. S. S. De Silva, S. M. T. Jayasena, M. D. M. Fernando</i>	92
Stability of polyphenols and vitamin C in selected Sri Lankan fruits and leafy vegetables under varying processing and storage conditions <i>A. Ananthakumaran, A. Hariharan, R. Ahamed, M. D. M. Fernando</i>	93
Adherence to the physiotherapy among patients with chronic respiratory diseases at Central Chest Clinic, Borella, Sri Lanka <i>A. M. M. H. De Silva, K. R. M. Chandrathilaka</i>	94
The relationship between the body mass index and physical activity level among Law Faculty students at the University of Colombo <i>V. M. Amaraweera, S. Weerasinghe</i>	95
An intricate connection between the mind and body: A case study of a 12-year-old girl with behavioural changes for 1 ½ years presenting with catatonic symptoms from Dehiwala <i>S. C. Wickramaratne, A. Herath, P. Rathnayake, S. Wijesinghe</i>	96
Can infra-inguinal vascular reconstruction be based on duplex ultrasonography alone? <i>A. M. Alabadaarachchi, K. M. A. B. Ilangasekara, P. H. R. S. Mendis, M. R. N. Cassim</i>	97
Awareness of physiotherapy as a treatment for urinary incontinence among mothers with pregnancy-related urinary incontinence at two main women's hospitals in Colombo District <i>S. A. L. Malithi, H. W. D. Warawita</i>	98
A cross-sectional study of health-related quality of life and patient satisfaction among stroke patients belonging to different post-stroke time durations, attending the National Hospital of Sri Lanka and the Rheumatology Rehabilitation Hospital <i>M. G. A. P. Dilshani, M. R. N. Cassim</i>	99

Effect of Body Mass Index (BMI) on quality of life, quadriceps and hamstring muscle strength among female older adults with knee osteoarthritis <i>N. C. T. E. Nanayakkara, A. Wickramasinghe</i>	100
Field evaluation of sandfly xenodiagnosis entomological technique for detecting Leishmania infection transmission in Sri Lanka <i>V. S. Kulatunga, D. S. Shantha, S. A. S. C. Senanayake, R. Dewasurendra, T. N. Samaranayake, M. P. Kanakkahegawa, N. Karunaweera</i>	101
Relationship between pain and functional disability across disease duration in rheumatoid arthritis <i>R. H. S. Shashiprabha, I. Atukorala</i>	102
Compliance audit on medico-legal documentation and reporting in University Child and Adolescent Mental Health Services at Lady Ridgeway Hospital for Children <i>R. Samanmalee, A. Herath, S. Wickramaratne</i>	103
Comparative evaluation of the lipase-inhibitory potential of <i>Bacopa monnieri</i> (L.) Wettst in five different dosage forms: An <i>in-vitro</i> study <i>H. L. N. R. Pradeep, P. K. Perera, P. R. Waratenne, N. Samaranayake, W. D. N. Dissanayake</i>	104
Translation and cultural adaptation of the STARx-Readiness for Transition Questionnaire into Sinhala for adolescents in Sri Lanka <i>P. B. D. Gomes, G. A. N. U. Gurusinghe, J. C. Ilangamge, S. N. Seneviratne</i>	105
Relationship between pelvic girdle pain and health-related quality of life among third-trimester pregnant mothers <i>K. D. P. Prasanthi, I. A. Jayawardane</i>	106
Non-invasive management of gastrostomy granuleomas in children using table salt: Outcomes from a retrospective review <i>A. Jayapathum, W. Hathagoda, S. Rajindrajith, L. Chandralekha, M. Samarasinghe, I. Rathnayake</i>	107
Assessment of effect of vitamin E supplementation on oxidative stress levels in children infected with Dengue virus in Sri Lanka <i>Y. L. Basnayake, W. Hathagoda, T. Thoradeniya, H. W. Dilanthi, V. P. Wickramasinghe</i>	108
Environmental sustainability gaps in research laboratories: Findings from an audit at the Faculty of Medicine, University of Colombo <i>J. A. T. S. Jayaweera, H. W. Dilanthi, S. T. Thoradeniya</i>	109
Relationship between lower extremity function and physical activity in older adults with chronic lower extremity pain in selected elderly homes in Kurunegala District <i>Y. Jayasooriya, D. W. Warawitige</i>	110
Paternal depression amongst expectant fathers in a suburban area in Sri Lanka <i>S. A. V. W. Wijesinhe, J. C. Chuwan, W. A. I. C. Wijesinghe, J. C. Ilangamge, C. Suraweera, S. Fernando</i>	111

Prevalence and factors associated with work-related musculoskeletal discomfort among carpenters in Moratuwa Divisional Secretariat, Sri Lanka	
<i>M. A. M. Amhar, K. R. M. Chandrathilaka</i>	112
Trends in depression in Sri Lanka: Findings from the SLHAS 2018-2024	
<i>L. S. Constantine, S. Kumar, R. P. Rannan-Eliya, S. D. Amarasuriya</i>	113
Uncovering the spectrum of inherited risk in colorectal cancer: A scoping review of low- and moderate-penetrant germline variants	
<i>K. Thillainathan, N. D. Sirisena, V. H. W. Dissanayake</i>	114
How depressed are we? Prevalence of depression in Sri Lanka (2018-2019)	
<i>S. Kumar, U. B. E. Sasanka, S. Amarasuriya, R. P. Rannan-Eliya</i>	115
The relationship between musculoskeletal pain, work-related posture and quality of life among jewellery manufacturing workers in Colombo District, Sri Lanka	
<i>A. G. A. N. Yasandi, M. R. N. Cassim</i>	116
Factors affecting willingness for live and deceased organ donation in a Sri Lankan urban community	
<i>A. Chandrakumar, N. S. B. O. C. Atapattu, K. G. I. Y. Bandara, K. S. M. T. D. G. Bandara, D. R. Wijayaratne</i>	117
Patient awareness and complications of arteriovenous fistula created for haemodialysis access: A case series	
<i>M. B. A. D. Samarawickrama, A. P. N. B. Samanmali, C. D. Samarawickrama, R. Samphel, J. Arudchelvam</i>	118
Occurrence of the Kappa-Casein allele B in the white cattle breed reared in government farm of Department of Animal Production and Health in the Eastern Province	
<i>M. S. M. Sharaz, M. S. K. Rabindrakumar, M. I. G. Jayathilaka, S. T. Thoradeniya</i>	119
Prevalence, knowledge, and practices related to needlestick injuries among third-year nursing students at the College of Nursing, Colombo	
<i>D. Perera, G. Perera, T. Perera</i>	120
The neuroprotective potential of red cabbage (<i>Brassica oleracea</i> L. var. <i>capitata</i> f. <i>rubra</i>) in Parkinson's disease: A systematic review	
<i>M. S. F. Sapra, M. I. Manuha, P. K. Perera, W. D. N. Dissanayake</i>	121

Evaluation of the antioxidant activity of the six selected herbal teas used in Sri Lanka

K. M. N. P. Kumari, K. Siridewa

Department of Biochemistry and Molecular Biology, Faculty of Medicine, University of Colombo, Sri Lanka

Oxidative stress, resulting from an imbalance between reactive oxygen species (ROS) and antioxidants, is a key factor in the progression of many chronic diseases. Plant-derived secondary metabolites are well-documented for their antioxidant properties, which have been a therapeutic target for various metabolic diseases. Plants have been consumed in different states, including herbal teas, which is a common cultural practice all over the world. This study is designed to assess the antioxidant potential of six selected herbal teas used in Sri Lanka. Decoctions were prepared by boiling 5 g of fresh plant material in 50 mL of distilled water at 95 °C for 1 h, yielding an initial concentration of 100 mg/mL (fresh weight basis). The tested plants included whole plants of *Cardiospermum halicacabum* (Wel penala), *Eleusine indica* (Belathana), *Hemidesmus indicus* (Iramusu), *Bacopa monnieri* (Lunuwila), and bark and leaves of *Terminalia arjuna* (Kumbuk). Decoctions were filtered and tested for antioxidant activity using the ABTS radical cation decolorization assay at 734 nm. Ascorbic acid was used as the standard reference. The IC₅₀ values were expressed in mg/mL. Data were analyzed using Tukey's one-way ANOVA, with significance set at $p < 0.05$. Among the tested samples, *T. arjuna* bark exhibited the strongest antioxidant activity with an IC₅₀ of 1.25 mg/mL, followed by *T. arjuna* leaves (6.994 mg/mL) and *H. indicus* (25.14 mg/mL). The remaining teas from *C. halicacabum*, *E. indica*, and *B. monnieri* demonstrated comparatively lower activity (IC₅₀ > 1.0 mg/mL). The differences between *T. arjuna* bark and the other samples were statistically significant ($p < 0.05$). Kumbuk bark tea is the best potential therapeutic for oxidative stress among the tested samples. Further evaluations are necessary to perceive antioxidant compounds and other associated metabolites in potential herbal teas to develop precise therapeutic strategies for oxidative stress with minimal side effects.

Keywords: *Antioxidants, Herbal teas, IC₅₀, Oxidative stress*

Association of Alpha-1-Acid Glycoprotein (AGP) with hsCRP: A marker of chronic inflammation and pro-inflammatory diet in adult women in the US

K. B. M. Kavirathne, P. Lanerolle, I. Waidyatilaka, M. De Lanerolle Dias

Department of Biochemistry and Molecular Biology, Faculty of Medicine, University of Colombo, Sri Lanka

Chronic diseases are commonly associated with chronic inflammation (CI). hsCRP is a well-established marker of CI, while α -1 acid glycoprotein (AGP), extensively studied in acute inflammation, remains understudied as a potential marker of CI. This analysis of secondary data was aimed at identifying AGP as a potential marker of CI by studying the association of AGP with hsCRP, and other factors associated with chronic inflammation. A dataset of the National Health and Nutrition Examination Survey, from August 2021-2023 was used for secondary data analysis. The dataset contained waist-circumference (WC), body mass index (BMI), hsCRP and AGP and two-day dietary recalls; from which mean percentage energy from sugars (TS), carbohydrates, fats, saturated fats, total energy and dietary fiber (DF) were calculated. Multivariate linear regression analysis was used to investigate the relationship between variables correlated with AGP. Receiver Operated Characteristic Curves (ROC) were used to determine an AGP cut off for CI using established cut offs for hsCRP. The dataset included 683 female participants aged 20-49. AGP significantly ($p < 0.001$) correlated with hsCRP. AGP and hsCRP were significantly ($p < 0.001$) correlated with TS, DF, WC, and BMI. Linear regression showed WC was positively, and DF was negatively correlated with AGP, corrected for TS. ROC curves showed AGP as a predictor of CI between the hsCRP range 3 mg/L to 7 mg/L. The AGP cut off obtained for CI was most sensitive and specific at an hsCRP cutoff of 4 mg/L where the AGP value obtained was 889.5 mg/L. This analysis suggests that AGP is a potential marker of CI, being most predictive at an hsCRP cut off of 4 mg/L. AGP correlated with WC, BMI, DF which are other factors associated with CI. This analysis highlights the need for further investigation and validation of AGP as a chronic inflammatory marker against other markers of CI.

Keywords: *Chronic inflammation, α -1 acid glycoprotein, High sensitivity C-reactive protein, Dietary fiber, Waist circumference*

Comparative evaluation of antimicrobial activity of peel extracts from five Sri Lankan banana varieties

A. C. H. Elaphatha¹, M. K. Ediriweera¹, S. M. T. Jayasena¹, Y. W. S. Suranadee²

¹Department of Biochemistry and Molecular Biology, Faculty of Medicine,
University of Colombo, Sri Lanka

²Department of Medical Microbiology and Immunology, Faculty of Medicine,
University of Colombo, Sri Lanka

Banana (*Musa sapientum*) peels are a significant source of valuable phytochemicals, and numerous studies have highlighted their antimicrobial activity, showcasing potential as a natural remedy for treating wound infections. In this study, hexane, ethyl acetate, and methanol extracts of peels from five banana varieties found in Sri Lanka, namely, Ambul, Anamalu, Kolikuttu, Rath kesel, and Seeni kesel, were evaluated for antimicrobial activity against four wound-associated pathogenic bacteria: *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Escherichia coli*, and ESBL-positive *Klebsiella pneumoniae*, using disk diffusion and minimum inhibitory concentration (MIC) assays. The extract showing the highest inhibitory effect was further fractionated using varying ratios of hexane and methanol by silica gel column chromatography, and the half-maximal inhibitory concentration (IC₅₀) of the most potent fraction was determined. Ethyl acetate extracts of Seeni kesel, Rath kesel, and Anamalu exhibited the largest inhibition zones in the disk diffusion assay, ranging from 7.0 mm to 9.7 mm against *E. coli* and 6.7 mm to 9.3 mm against *P. aeruginosa* at a concentration of 12 mg/disk. In the MIC assay, all peel extracts effectively inhibited *E. coli* and *P. aeruginosa* at concentrations below 250 mg/mL, confirming their antimicrobial potential. Notably, the ethyl acetate extract of Anamalu demonstrated the lowest MIC values, 3.9 mg/mL against *P. aeruginosa* and *S. aureus*, and 7.8 mg/mL against *E. coli* and *K. pneumoniae*, indicating the highest antimicrobial potency. Among the fractions eluted from the Anamalu ethyl acetate peel extract, fraction 4, having a hexane to methanol ratio of 3:7, was identified as the most potent, with an IC₅₀ of 3.69 mg/mL against *S. aureus*, highlighting its potential as a significant antibacterial agent. These findings suggest that the ethyl acetate extract of Anamalu banana peels possesses comparatively higher antimicrobial potential. Further research is needed to identify bioactive phytochemicals and explore their application in treating wound infections.

Keywords: *Banana peel, Antimicrobial activity, Wound pathogens*

**Prevalence and risk factors associated with *Enterobius vermicularis* infection
among 3 to 10-year-old children in the Halpathota Central Grama Niladari
Division of Baddegama, Galle District, Sri Lanka**

P. V. E. H. Goonawardhana¹, P. K. S. Geethika¹, G. Ghamshayeni¹, K. M. K. C. Gunaratne¹,
S. Gunawardena²

¹*Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Parasitology, Faculty of Medicine, University of Colombo, Sri Lanka*

Enterobiasis, caused by the nematode *Enterobius vermicularis* (pinworm), remains one of the most common helminth infections worldwide, particularly affecting school aged children. This study investigated the prevalence and risk factors of *E. vermicularis* infection among children aged 3-10 years in the Halpathota Central Grama Niladari Division of Baddegama in Galle District, Sri Lanka. Using a descriptive cross-sectional study design, data were collected in August 2024 through interviewer-administered structured questionnaires and perianal scotch tape swabs for parasite detection. Detailed instructions were provided to parents/caregivers on the sampling process. Microscopic examination of swabs was done at the laboratory of the Department of Parasitology, University of Colombo. Data were analysed using SPSS statistical software v27 with calculation of frequencies and proportions for categorical variables, while chi-square analysis was done to investigate factors linked to prevalence of enterobiasis. Ethical clearance for the study was obtained from the Ethics Review Committee of the Faculty of Medicine, University of Colombo. Among 123 successfully analysed samples, the prevalence of enterobiasis was found to be 29.27% (n=36). While all parents/caregivers were aware of enterobiasis, significant risk factors associated with infection included younger age (3-7 years, $p=0.027$), inadequate hand washing before meals ($p<0.001$), finger-sucking behaviour ($p<0.001$), less frequent household cleaning ($p=0.003$), and lack of prior deworming ($p=0.008$). Other sociodemographic factors and hygiene practices showed no significant association with infection rates. These findings highlight the need for targeted interventions focusing on improving personal hygiene practices and regular deworming, particularly among younger children in this region.

Keywords: *Pinworm infection, Enterobiasis, Galle District, Sri Lanka, Scotch tape*

Association of lifestyle and reproductive factors with age at natural menopause among postmenopausal women in Gampaha District

K. G. D. S. Premasinghe, P. H. D. N. Punchihewa, R. D. T. Rajamanthri,
R. W. V. N. A. Rajapaksha, P. M. Atapattu

Faculty of Medicine, University of Colombo, Sri Lanka

Lifestyle and reproductive factors are associated with age at menopause. However, there is limited evidence regarding Sri Lankan women. To describe the association between age at natural menopause and lifestyle and reproductive factors among postmenopausal women in Gampaha a cross-sectional study was conducted in 126 postmenopausal women. Lifestyle factors (diet, physical activity, smoking and alcohol consumption) and reproductive factors (age at menarche, parity, breastfeeding and contraceptive use) were evaluated via interviewer-administered questionnaires, utilizing standardized tools (24-hour dietary recall, International Physical Activity Questionnaire and Reproductive History Questionnaire of Women's Health Initiative). Mean ($\pm$ SD) age at natural menopause and menarche were 48.37 ($\pm$ 5.40) and 13.73 ($\pm$ 1.32) years respectively. 4.8% had premature menopause. Mean parity was 2.39 ($\pm$ 1.12). Mean daily caloric intake (961.02 ± 233.70 kcal) was low. Most (72.2%) reported high physical activity levels. 7.9% were passive smokers. Most (67.5%) had breastfed for >4 years. Only 35.71% had ever used contraceptives. No statistically significant associations emerged between lifestyle/reproductive factors and menopausal age. The age at menopause corresponds with prior local studies. Results highlight needs for better nutrition and contraceptive education.

Keywords: *Age at menopause, Lifestyle, Reproductive, Diet, Physical activity*

Occupational morbidities and their association with preventive practices among salt pan workers in Hambantota District, Sri Lanka

G. H. Lakmal¹, U. G. I. K. Kumarasiri¹, M. P. R. Lakpriya¹, N. P. Kumarasena¹,
C. Arambepola²

¹*Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Community Medicine, Faculty of Medicine, University of Colombo, Sri Lanka*

Salt production in Sri Lanka heavily relies on manual labour. Salt pan workers are constantly exposed to occupational health hazards such as sun exposure, physical strain and contact with brine, leading to many morbidities. Despite the risk, their health remains highly neglected in Sri Lanka. The aim of this study was to describe the occupational morbidities among salt pan workers in Sri Lanka and their association with preventive practices related to occupational health hazards. A descriptive cross-sectional study was conducted among 140 salt pan workers in Hambantota District. Those with <1 year work experience, drivers and supervisors were excluded. Participants were selected using systematic sampling from the attendance register. Sociodemographic characteristics, use of personal protective equipment (PPE) and self-reported occupational morbidities were assessed using a validated interviewer-administered questionnaire. Hypertension was determined using a sphygmomanometer. Associations of occupational morbidities were assessed with preventive practices using chi-squared test at 5% significance level. The majority were males (58.4%) aged 40-49 years (37.6%) and educated up to Ordinary Level (56%). The most prevalent occupational morbidities were musculoskeletal problems (77.6%) followed by hypertension (40.8%), eye (40%), dermatological (22.4%) and respiratory (10.4%) problems. Low back pain, burning sensation in eyes, eczema and asthma were the most frequently reported within each category respectively. Among those who reported accidental injuries (26.4%), shovel injuries were the most common. As PPE, 96% workers used at least one protective measure, of which protective clothing was the most widely used (82.4%). Least used PPEs were face masks (16.8%) and protective sunglasses/goggles (18.4%). Non-use of protective-sunglasses/goggles was significantly associated with eye lacrimation ($p=0.005$) and redness ($p=0.011$). Salt pan workers experience a wide range of occupational morbidities affecting multiple body systems. The use of protective eye wear should be promoted to prevent eye-related morbidities.

Keywords: *Salt pan workers, Health hazards, Personal protective equipment*

Development of a novel simulated wound exudate using gelatine

H. M. Shafqat¹, A. C. Elaphatha², S. M. T. Jayasena²

¹*Department of Biomedical Science, BMS School of Science, Colombo, Sri Lanka*

²*Department of Biochemistry and Molecular Biology, Faculty of Medicine,
University of Colombo, Sri Lanka*

Simulated wound fluids (SWFs), which accurately replicate the wound exudate in terms of biochemical and physical characteristics are integral for clinically relevant *in vitro* evaluation of therapeutics such as wound dressings. However, conventional formulations which rely on bovine serum albumin (BSA) are expensive. The objective of this study was to develop a low-cost formulation for SWF containing an alternative protein source. Each of the SWF variants was formulated with equivalent salt-buffer composition and 34 g/L of protein. Egg white-based and gelatine-based SWFs were prepared and compared with a BSA-based SWF. All SWF samples were filter sterilized. Each SWF was inoculated with a suspension of *Staphylococcus aureus* and incubated for 24 hours at 37 °C. The viability of bacteria was confirmed by MTT assay, and the growth was quantified by optical density (OD₆₀₀). All assays were conducted in triplicate. Highest bacterial growth (OD₆₀₀ = 0.490 ± 0.0078) was supported by the gelatine-based SWF, compared to BSA-SWF (0.314 ± 0.0179) and egg white-SWF (0.284 ± 0.0106). The low growth in egg white SWF is attributed to its intrinsic antimicrobial proteins: lysozyme, ovo-transferrin, and avidin. These results demonstrate that gelatine is a potential cost effective and readily available alternative to BSA for development of SWF. It delivers reproducible bacterial growth which is comparable to that observed with BSA. The availability of a cost-effective SWF would increase accessibility and improve the scalability of wound infection models assisting in high throughput screening of wound dressings and antimicrobials under conditions which closely mimic the wound milieu.

Keywords: *Simulated wound fluid, Wound exudate, Bovine serum albumin, Gelatine, Egg white*

Leisure Reading habits and user-centered recommendations from medical undergraduates: Insights from a Sri Lankan medical library

K. K. N. L. Perera¹, C. Liyanage², R. M. T. N. Rajapaksha², C. Weeraratne², D. C. Kuruppu¹,
D. B. L. Samaranayake³

¹Medical Library, Faculty of Medicine, University of Colombo, Sri Lanka

²Department of Pharmacology, Faculty of Medicine, University of Colombo, Sri Lanka

³Department of Community Medicine, Faculty of Medicine, University of Colombo, Sri Lanka

This study aimed to explore medical undergraduates' Leisure Reading (LR) habits and suggestions to improve the LR collection, and it is the first such documented investigation in a medical library of a Sri Lankan state university. The study used a descriptive cross-sectional design. Stratified random sampling gathered 274 students across 04 academic years. Self-administered questionnaires were distributed. SPSS (v.28) and thematic analysis method were used for quantitative and qualitative analysis, respectively. The response rate was 91% (n=249). LR frequencies were daily 21 (8.4%), monthly 29 (11.7%), weekly 37 (15.0%), rarely 127 (51.0%), never 35 (13.9%). A significant association was observed between academic year and reading frequency (χ^2 , $p < 0.05$). Academic years 1 and 3 were more strongly associated with 'rarely' reading, whereas years 2 and 4, with 'never' reading. Popular genres were mystery 124 (49.6%), fantasy 115 (46.0%), and adventure 101 (40.5%). Highly preferred language was English 124 (49.6%). Many students, 146 (58.4%) accepted that LR practice declined after university entrance. Increased mobile phone usage 45 (18.2%), lack of interest 43 (17.2%), and time constraints 42 (16.8%) were common reasons associated. A majority 199 (80.0%) mentioned that social media usage reduced their reading interests. Genre preferences were influenced by gender. Males favored science and historical fiction, whereas females favored fantasy and mystery (χ^2 , $p < 0.05$). Three genre-based reader profiles were revealed via cluster analysis (*preferring science fiction, fantasy and thrillers/biographies, professional development stories, and poetry/different genres with less intensity*). Considerable number of (n=107; 43.0%) students read e-formats. Popular e-formats were PDFs 25 (23.2%), YouTube 21 (19.6%), and Apple Books 17 (16.1%). Many 212 (85.0%) believe 'LR inculcates humanistic qualities in health professionals'. Frequent readers and those who used e-books were more likely to view LR as a means of supporting humanistic qualities ($p < 0.05$). User suggestions were categorized into 15 themes from the thematic analysis. This study provides evidence-based patterns in LR habits of medical students, highlighting empirically grounded enrichments of LR collections.

Keywords: Leisure Reading, Leisure Reading habits, Medical undergraduates, State University, Sri Lanka

Functional mobility, self-efficacy, and their impact on health-related quality of life among residents of selected elderly homes in the Kurunegala District

M. I. F. Amani, A. H. Wettasinghe

Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka

As populations age rapidly, improving health-related quality of life is crucial for preserving autonomy. While functional mobility is vital in maintaining independence, self-efficacy motivates older adults to stay active. Sri Lanka, with its growing elderly population, lacks sufficient data on how these factors affect quality of life. This study aims to investigate the relationship between functional mobility, self-efficacy, and health-related quality of life (HRQoL) in elderly residents in Kurunegala District. A cross-sectional study was conducted at selected elderly homes in Kurunegala District in August 2024, using a non-probability convenience sampling method among individuals aged 60 years and above. Self-efficacy and functional mobility were evaluated using General Self-efficacy (GSE) scale and Timed Up and Go (TUG) test, respectively. The HRQoL was measured using the 36-item Short Form Health Survey (SF-36). Spearman's rank correlation test was used to identify the correlation between variables in SPSS version 22 software. One hundred twelve older adults ($n=112$; age 75 ± 8.05 years), including 71 (63.4%) females, were recruited in the study. The GSE scores (30.58 ± 6.5) showed a statistically significant positive correlation with physical component summary (PCS) of SF-36 ($r_s=0.560$, $p<0.001$). In contrast, TUG time (20.62 ± 12.4 seconds) was significantly negatively correlated with PCS ($r_s=-0.498$, $p<0.001$). No statistically significant correlation was found between either TUG time or GSE scores with mental component summary (MCS) of SF-36. However, TUG time and GSE scores were significantly correlated with most domains of HRQoL. The findings suggest that higher self-efficacy and better functional mobility are significantly associated with improved physical HRQoL among older adults. While no significant associations were found with mental health components, the strong links observed between self-efficacy, mobility, and multiple domains of quality of life highlight the importance of promoting both psychological resilience and physical function to enhance overall well-being.

Keywords: *Functional mobility, Self-efficacy, Timed up and go test, Elderly, Quality of life, General self-efficacy scale*

Relationship of kinesiophobia with functional disability and quality of life in patients with chronic non-specific low back pain attending two selected hospitals in Colombo District

J. U. Gunawardhana¹, G. G. Ponnampereuma²

¹*Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Medical Education, Faculty of Medicine, University of Colombo, Sri Lanka*

Chronic non-specific low back pain (LBP) is highly prevalent and a major contributor to the disease burden worldwide. Patients with chronic non-specific LBP frequently exhibit kinesiophobia that leads to functional disability and reduced quality of life. This study aimed to investigate the relationship of kinesiophobia with functional disability and quality of life in patients with chronic non-specific LBP attending two selected hospitals in Colombo District. This analytical cross-sectional study was conducted among 117 patients with chronic non-specific LBP attending the National Hospital of Sri Lanka and the Colombo South Teaching Hospital. Participants aged above 18 years were recruited using non-probability sampling. The Tampa Scale of Kinesiophobia (TSK-17), Oswestry Disability Index (ODI), and Short-Form-36 (SF-36) questionnaires were used to assess kinesiophobia, functional disability, and quality of life, respectively. Descriptive statistics and Spearman's rank correlation coefficient were used for statistical analysis. Among 117 participants (95.12% response rate), 61.5% (n=72) were females and 38.5% (n=45) were males. A majority (77.78%, n=91) of the participants exhibited a high degree of kinesiophobia. The male:female ratio among those with high kinesiophobia was the same as the male:female ratio in the sample. The TSK-17 score reported a significant moderate positive correlation with the ODI score ($r_s=0.530$, $p<0.001$). A significant moderate negative correlation was found between the TSK-17 score and the physical component summary score of the SF-36 ($r_s=-0.333$, $p<0.001$). However, a non-significant negative correlation was found between the TSK-17 score and the SF-36 mental component summary score. Kinesiophobia showed a significant moderate positive correlation with functional disability. A significant moderate negative correlation was found between kinesiophobia and the SF-36 physical health component, but showed a non-significant correlation with the mental health component. These findings underscore the necessity of addressing kinesiophobia when developing preventive and therapeutic rehabilitation programmes for low back pain patients to enhance patient outcomes.

Keywords: *Kinesiophobia, Functional disability, Quality of life, Chronic non-specific low back pain*

Knowledge, attitudes, practices and associated factors regarding CSE among teachers of adolescents in the Kurunegala education division

M. F. F. Shahidha¹, M. Saraneekaran¹, V. S. S. Abeywickrama¹, J. A. H. V. Sandanayake¹,
I. Karunathilake²

¹*Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Medical Education, Faculty of Medicine, University of Colombo, Sri Lanka*

Comprehensive sexuality education (CSE) is a curriculum-based approach that addresses the cognitive, emotional, physical, and social aspects of sexuality. The increasing global and local burden of teenage pregnancies and sexually transmitted infections highlights the need for structured sexuality education among adolescents. In Sri Lanka, teachers play a key role in delivering CSE; however, limited research exists on their knowledge, attitudes, and practices (KAP). A descriptive cross-sectional study was conducted among all science and physical health education teachers in all 13 Types 1AB mixed schools in the Kurunegala Education Division, excluding those absent during data collection. Data were collected using a structured, pre-tested, self-administered questionnaire covering socio-demographic characteristics and KAP on CSE. Scores were calculated, and teachers were categorized as having “good” or “poor” levels based on whether their score was above or below the mean. Data were analyzed using SPSS version 27 with descriptive statistics and chi-square tests. Only bivariate analysis was done due to the study design and sample size. All 127 teachers participated (100% response rate). The mean age was 44.6 years (SD $\pm$ 9.0); 72.4% were female and 87.4% were Sinhala. Average teaching experience was 16.5 years (SD $\pm$ 9.4). Most were university graduates (54.3%) and taught science (74.8%). Good knowledge was observed in 63.8%, positive attitudes in 61.4%, and good practices in only 33.1%. Female teachers had significantly better knowledge ($p=0.028$). Higher education was significantly associated with better practices ($p=0.026$). Positive attitudes correlated with higher knowledge ($p=0.001$) and better practices ($p < 0.001$). Despite adequate knowledge and attitudes, CSE-related practices were low. Incorporating CSE training into teacher education and ongoing professional development is recommended.

Keywords: *Comprehensive sexuality education, Adolescent, Teachers, Sri Lanka*

Water turnover by deuterium dilution in adult males

B. Sewwandi, M. De Lanerolle Dias, I. Waidyatilaka, P. Lanerolle

*Department of Biochemistry and Molecular Biology, Faculty of Medicine,
University of Colombo, Sri Lanka*

Water turnover (WT) is the movement of ingested and metabolic water through the body and its elimination from the body. WT helps in the understanding of hydration and optimal water intake, and metabolism in disease states. Water turnover was studied in 18 adult males. Baseline saliva samples were collected after 2-hours of fasting. A 30 g dose of deuterium-oxide was administered to estimate total body water (TBW) and WT by the gold standard deuterium dilution method. Following equilibration, post-dose saliva samples were collected at 3 and 3.5 hours (enrichment) and again on day 3, 7 and 11 to assess deuterium elimination over time; water-turnover-rate (WTR). Deuterium enrichment in saliva was determined by Fourier Transform Infrared Spectroscopy. The characteristics of WT were determined by plotting deuterium enrichment against time for each participant. The elimination time intervals were categorized as day 1 to day 3 (early-phase), day 3 to day 7 (middle-phase), day 7 to day 11 (late-phase). Deuterium enrichment at 3 and 3.5 hours post dose was used to calculate TBW, from which Fat-Free-Mass (FFM)% was calculated. The shapes of the WT graphs of each individual were studied to determine the characteristics of water elimination and a protocol for calculating WT was developed in the early phase of elimination, which compared well with published work. Individuals with more FFM% had higher WTR ($p < 0.05$) which could be explained through higher metabolism. WTR assessed for the first time in Sri Lanka via deuterium dilution, showed a biologically expected relationship with FFM which is a reflection of metabolic rate. Our preliminary findings suggest that hydration advice can be tailored to FFM% to optimize fluid balance in health, and needs further investigation, especially in disease states.

Keywords: *Body composition, Water turnover rate, Water turnover, Deuterium dilution, Total body water*

Religious, spiritual practices and its association with mental health in middle-aged schoolteachers in Colombo, Sri Lanka

M. Wijesinghe¹, C. Wijesinghe¹, R. Wijesinghe¹, P. Wijesinghe¹, A. Gallage²

¹*Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Community Medicine, Faculty of Medicine, University of Colombo, Sri Lanka*

Mental health disorders are rising globally and in Sri Lanka, with depression peaking between ages 55 and 74 years. Schoolteachers face unique professional and socioeconomic stressors including heavy workload, classroom management and pressure to meet standards, making their mental health crucial. Religious and spiritual practices have long served as coping mechanisms in Sri Lanka. Exploring their role in teachers' mental health could inform interventions and policies, strengthening the educational workforce. An analytical cross-sectional study was conducted among 121 randomly selected schoolteachers using a two-stage cluster sampling technique where schoolteachers aged 45-60 years were included from three randomly selected national schools and one AB Provincial school in Colombo educational zone. A self-administered questionnaire was used to collect sociodemographic data and information on religious and spiritual practices. A composite religiosity, spirituality score was calculated based on responses. Mental health status was assessed using the validated General Health Questionnaire-30 (GHQ-30). GHQ-30 scores were categorized into high and low levels of psychological distress using a cutoff value validated for the Sri Lankan population in a previous study. As the composite religiosity, spirituality score demonstrated an approximately normal distribution, an independent samples t-test was used to compare mean scores between participants with high vs. low psychological distress. Additionally, a chi-squared test was performed to assess the association between categorized religiosity, spirituality level (dichotomized around the mean) and GHQ-30 category. Each individual's religious or spiritual practice assessed in the questionnaire was also dichotomized into high and low levels, and their associations with psychological distress categories were examined using chi-squared tests. All 121 selected teachers responded (response rate: 100%). The majority were female (n = 97; 80.2%) and Buddhist (n = 116; 95.9%). Among Buddhists, common practices included daily offering of flowers to the Buddha (n = 80; 69.0%) and monthly temple visits (n = 71; 61.2%). Psychological distress (GHQ-30) was present in 23 participants (19.0%). No statistically significant associations were found between religious or spiritual practices and psychological distress ($p > 0.05$). Differences in religious, spiritual practices showed no significant association on teachers' mental health. The high psychological distress among middle-aged schoolteachers calls for evidence-based interventions to reduce stress and promote well-being in the educational sector, beyond reliance on informal or traditional coping mechanisms.

Keywords: *Religious, Spiritual practices, Mental health, Schoolteachers*

Association of overweight and obesity with genu valgum and genu varum among 10–19-year-old female students in selected schools in Gampaha District

B. D. R. N. Perera¹, S. S. Y. Withanage²

¹*Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Medical Microbiology and Immunology, Faculty of Medicine, University of Colombo, Sri Lanka*

Adolescent obesity is a growing global health concern. Excess body weight is believed to contribute to angular deformities of the lower limbs, such as genu valgum and genu varum. Identifying this association is crucial for planning early preventive strategies that aim to reduce long-term musculoskeletal complications in adolescents. A descriptive cross-sectional study was conducted among 130 female students aged 10–19 years from two selected schools in the Gampaha District. The presence of genu valgum and genu varum was determined by measuring the intermalleolar distance and intercondylar distance, respectively, with a value ≥ 2.5 cm considered positive. The body mass index (BMI) was calculated and used to classify participants as obese or overweight. Data were analyzed using Pearson's chi-square test in SPSS version 22 to determine associations between BMI categories and genu valgum and genu varum. Among the 130 participants, 75.4% were Sinhalese. The prevalence of obesity and overweight was 8.5% and 20%, respectively. The prevalence of genu valgum and genu varum was 16.2% (n=21) and 14.6% (n=19), respectively. A statistically significant association was observed between obesity and genu valgum ($p = 0.006$), and between overweight and genu valgum ($p < 0.001$), while there was no statistically significant association between obesity and overweight and genu varum. There's a significant association between genu valgum and obesity and overweight among female adolescents, but no significant association with genu varum. This may be because genu valgum is linked to increased knee stress from excess weight, while genu varum is often related to nutritional deficiencies, genetics, or early development. These results emphasize the importance of early screening and health education programmes in schools to promote healthy body weight and prevent lower limb deformities during adolescence.

Keywords: *Obesity, Overweight, Genu Valgum, Genu Varum, Adolescent health*

Knowledge and factors associated with knowledge regarding basic life support among undergraduates in the science faculty of a selected state university in Colombo District

R. S. Hameem¹, M. R. F. Reema¹, M. A. D. Rinoshika¹, S. N. D. Rosa¹,
D. M. S. Jayawardena²

¹*Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Community Medicine, Faculty of Medicine, University of Colombo, Sri Lanka*

Basic Life Support (BLS) plays a critical role in improving outcomes during medical emergencies. Science undergraduates are well-positioned to learn BLS and promote its awareness among the public. However, their level of BLS knowledge remains inadequately studied. Hence, this study describes the knowledge and factors associated with knowledge regarding BLS among undergraduates in the science faculty of a selected state university in Colombo District. A descriptive cross-sectional study was conducted among 140 undergraduates from the science faculty of a selected state university in the Colombo District. Systematic sampling was used. Data were collected through a pre-tested, structured, self-administered questionnaire. Data were analyzed using SPSS version 20. A score below 5.95 out of 12 was categorized as 'poor' knowledge, while scores of 5.95 or above indicated 'good' knowledge. Factors were cross tabulated with the level of knowledge. Chi square test was used to assess the significance. The response rate was 90.7%. The majority (74.8%) had poor knowledge regarding BLS. Unresponsiveness and absence of pulse were identified correctly as the features of cardiac arrest by 52.8% and 44.1% respectively. Only 12.6% knew the correct chest compression to breath ratio, while 47.2% identified the correct chest compression site, and 15% were aware of the correct compression force. Of the study sample, 81.9% knew the 1990 ambulance service number correctly. A statistically significant association was observed between BLS knowledge and provinces ($p=0.007$), employment status ($p=0.001$) and previous BLS training ($p=0.002$). Overall knowledge of BLS among participants was low. Targeted interventions should be implemented to enhance knowledge, with attention to the associated factors.

Keywords: *Basic life support, Knowledge, Factors, Undergraduates*

Knowledge and practices of usage of paracetamol as an over-the-counter medicine among adult patients attending a selected hospital setting

L. P. T. D. Wijetunga¹, M. R. F. Sahna¹, K. M. Wijesooriya¹, A. Y. Anuththara¹,
S. D. Amarasuriya²

¹ Faculty of Medicine, University of Colombo, Sri Lanka

² Department of Medical Humanities, Faculty of Medicine, University of Colombo, Sri Lanka

Paracetamol is a commonly used over-the-counter (OTC) analgesic and antipyretic medication. Unintentional overdosing of paracetamol following self-medication is a prevalent and concerning issue, as it can cause serious adverse effects, including hepatotoxicity. Public understanding of its safe dosage, frequency of administration and potential drug interactions remains inadequate, as suggested by previous studies. This study aims to evaluate the knowledge, usage patterns and practices related to paracetamol consumption among adult patients attending a selected hospital setting. A descriptive cross-sectional study was conducted at the Outpatient Department of the District Hospital Maligawatte. Using systematic sampling, 130 adults aged 20-60 years were recruited. Data were gathered using a pretested, interviewer-administered questionnaire, validated by experts. The questionnaire explored socio-demographic details, reasons for paracetamol use, dosage practices, and knowledge regarding safety and maximum recommended doses. Knowledge scores were classified into “Satisfactory” or “Poor” categories. Data analysis was performed using SPSS. The participants were predominantly female (63.8%), with a mean age of 40.2 years. Overall, 56.2% demonstrated satisfactory knowledge of paracetamol use, with most correctly identifying the recommended 6-hour dosing interval. However, only 17% were aware of the correct maximum daily dose. Paracetamol was primarily used to manage fever (84.6%) and headaches (83.1%). No statistically significant association was observed between knowledge levels and age, gender or education. Although the majority of the participants demonstrated satisfactory overall knowledge and reported appropriate dosing intervals, the awareness of critical safety parameters, particularly the maximum daily dose, was notably poor. This poses a significant risk of adverse effects, given the widespread use of the medication. Targeted public education, clearer product labelling and routine counselling by healthcare professionals are warranted to mitigate preventable harm.

Keywords: *Paracetamol, Over-the-counter, Knowledge, Practices*

Association between digital device usage and cognitive development among primary school children in grades 3 and 4 in Sri Jayewardenepura educational zone

T. S. S. Dissanayake¹, M. T. Diwakara¹, S. K. Edirisinghe¹, S. H. Elvitigala¹, W. Hathagoda²

¹*Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Paediatrics, Faculty of Medicine, University of Colombo, Sri Lanka*

Cognition involves the mental processes of acquiring knowledge and understanding through thought, experience, and the senses. It includes attention, memory, reasoning, and visual-auditory processing, which are essential for a child's overall development. The use of digital devices among children has risen considerably, especially after their incorporation into education during the COVID-19 pandemic. Therefore, we aim to investigate the connection between digital device use and cognitive development among grades 3 and 4 students in the Sri Jayewardenepura Educational Zone. A cross-sectional descriptive study was conducted in schools selected via cluster sampling. Data on socio-demographics and digital device use were gathered through a self-administered questionnaire. Cognitive development was evaluated using a custom-designed tool. Following Indian Paediatrics guidelines, participants were grouped based on whether they used devices for less than or more than 2 hours daily. Data analysis involved descriptive statistics and chi-squared tests conducted with SPSS. A total of 197 students in grades 3 and 4 participated in the study. Mean digital device usage was 1.18 hours (SD = 0.67) on weekdays and 1.46 hours (SD = 0.95) on weekends. The mean cognitive score was 55.80 (SD = 10.52). No significant association was found between device usage and cognitive scores on weekdays ($\chi^2 = 0.293$, $p = 0.58$) or weekends ($\chi^2 = 0.543$, $p = 0.46$). However, significant associations were observed between weekday usage and primary caretaker ($\chi^2 = 4.688$, $p = 0.030$), between weekend usage and playtime without devices ($\chi^2 = 11.875$, $p = 0.001$), and between household income and weekend usage ($\chi^2 = 5.478$, $p = 0.019$). The average device usage among participants stayed within the recommended limit of less than two hours per day. Usage was higher on weekends than during weekdays. Awareness programmes are recommended to educate the public about safe digital device use and its potential impact on children's health.

Keywords: *Cognitive development, Digital devices, Children*

Efficacy and safety of herbal therapies in the treatment of hyperlipidemia: A systematic review of randomized controlled trials

R. M. T. N. Rajapakshe, W. M. P. C. Weerasekara, P. Ranasinghe

Department of Pharmacology, Faculty of Medicine, University of Colombo, Sri Lanka

Hyperlipidaemia is a significant global health burden contributing to approximately 4.4 million deaths annually. Although conventional lipid-lowering therapies are effective, concerns regarding fear of adverse effects and medication adherence have increased interest in herbal interventions. This systematic review aimed to critically evaluate the efficacy and safety of herbal interventions for hyperlipidaemia management based on randomized control trial (RCT) evidence. A comprehensive literature search was conducted across PubMed, Web of Science, Scopus, and ScienceDirect, following PRISMA guidelines. Included studies were RCTs conducted on human participants, assessing combined or single herbal interventions compared with placebo, lifestyle modifications or standard lipid-lowering therapies. Data extraction was performed using standardized forms, collecting information on plant species, study characteristics, participants' demographics, intervention details and lipid profile outcomes, including total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), high density lipoprotein cholesterol (HDL-C), and triglycerides (TG). A total of 100 eligible articles were included in the final review. Plant-wise analysis revealed promising results for several herbal interventions. *Zingiber officinale* (n=2) showed TC reduction ranging from 4.69-11.62 mg/dL, HDL-C increase of 1.74-2.26 mg/dL and TG reduction of 2.17-4.64 mg/dL. *Aloe vera* (n=3) demonstrated variable TC changes from 2.4-24.4 mg/dL and TG reduction from 69.10-97.2 mg/dL. *Allium sativum* (n=4) studies indicated variable changes in lipid parameters with TC reduction ranging from 3.00 – 27.46 mg/dL. *Trigonella foenum-graecum* (n=2) showed minimal TC reduction, ranging from 0.80-2.01 mg/dL. The extracted data encompassed various populations, intervention durations ranging from weeks to months and different dosage forms. Safety profiles were reported with minimal adverse effects. This systematic review provides evidence highlighting the potential of several herbal therapies for hyperlipidaemia management. However, standardization of herbal products, optimal dosing protocols and long-term safety assessments remain important considerations for clinical applications.

Keywords: *Hyperlipidaemia, Dyslipidaemia, Systematic review, Herbal interventions, Randomized control trials*

Association between body mass index, stress, and physical activity levels among bank officers in selected banks in Colombo District, Sri Lanka

K. H. N. De Silva¹, P. W. P. Chathurangana²

¹*Department of Allied Health Science, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Pediatrics, Faculty of Medicine, University of Colombo, Sri Lanka*

Bank officers are at increased risk for sedentary lifestyle-related health issues due to prolonged sitting and high job stress. This study aimed to assess the association between Body Mass Index (BMI), stress, and physical activity levels among bank officers in selected banks in Colombo District, Sri Lanka. A descriptive cross-sectional study was conducted among 120 bank officers aged 18–60 years from People's Bank and Sampath Bank. BMI was calculated using standardized height and weight measurements. Stress and physical activity levels were assessed using the Perceived Stress Scale (PSS10) and the International Physical Activity Questionnaire–Short Form (IPAQ-SF), respectively. Data analysis employed the chi-square test using Statistical Package for the Social Sciences (SPSS) version 23 to examine associations between variables. Of the 120 bank officers studied, 55.8% (n = 67) were male, with a mean age of 36.28 ± 9.77 years. The majority (26.7%, n = 32) had a normal BMI. Low physical activity levels were reported by 46.7% (n = 56), and 40.0% (n = 48) experienced moderate stress. Significant associations were found between BMI and stress ($p=0.032$), BMI and physical activity ($p=0.001$), and physical activity and stress ($p=0.001$). The findings highlight key associations between low physical activity, high stress, and increased BMI, reinforcing the need for workplace strategies to enhance health among bank officers.

Keywords: *Body mass index, Physical activity, Stress, Bank officers*

Exploring indications and findings: A two-year experience in paediatric upper gastrointestinal endoscopy

W. Hathagoda¹, A. Jayapathum^{1,2}, S. Rajindrajith¹

¹*Department of Paediatrics, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Lady Ridgeway Hospital for Children, Colombo, Sri Lanka*

Upper gastrointestinal endoscopy (UGIE) plays a vital role in managing paediatric gastrointestinal conditions. However, local data on diagnostic and therapeutic yields remain limited. This study aimed to assess the clinical indications, findings, and therapeutic interventions in paediatric UGIE at the leading tertiary children's hospital in Sri Lanka. A descriptive study was carried out at the Gastroenterology unit of Lady Ridgeway Hospital for Children, Colombo, from 2023 to 2025. Data were collected retrospectively from the hospital database and analysed using SPSS version 27. A total of 405 UGIE procedures were performed on 292 children (56.8% male and 43.2% female), with a mean age of 7.54 years (SD = 4.38). The majority (96.8%) were elective procedures, with the primary indication for endoscopy being the assessment of prehepatic portal hypertension (39.0%), followed by surveillance endoscopy for paediatric inflammatory bowel disease (16.4%). Other indications included biliary atresia (9.2%) and Wilson's disease (5.8%). Esophageal varices were detected in 60% of procedures, while portal hypertensive gastropathy and fundal varices were observed in 10.6% and 7.4%, respectively. Among children with esophageal varices, Grade III varices were the most common (31.4%), with 47.4% affected across three or more columns. The overall diagnostic and therapeutic yields of the procedure were 67.2% and 82%, respectively. Band ligation was the main approach (78.3%), followed by sclerotherapy (2.9%) and glue injection (0.8%). No major procedural complications were reported. Pediatric upper GI endoscopy can be safely and effectively performed across a wide age range and should be introduced early when necessary. It provides a high diagnostic and therapeutic yield in children with portal hypertension and chronic gastrointestinal disorders.

Keywords: *Upper Gastrointestinal Endoscopy, UGIE, Children*

Impact of donor type on short-term renal transplant outcomes in a tertiary center

P. H. R. S. Mendis, J. Arudchelvam, D. S. Palihakkara, T. Gooneratne, R. Cassim,
M. Wijeyratne

*Vascular and Transplant Unit, Department of Surgery, Faculty of Medicine, University of Colombo/
National Hospital, Colombo, Sri Lanka*

Kidney transplantation (KT) remains the definitive treatment for end-stage renal disease. This study aimed to assess and compare the outcomes of cadaveric (CD) and live donor (LD) renal transplantation at the Professorial Vascular and Transplant Surgical Unit, National Hospital, Colombo. A retrospective cohort study was carried out, analyzing KT done from January 2023 to July 2025. Data were collected from the theatre registry. A total of 57 KT was included, of which 38 were LD and 19 were CD. The mean follow-up was 334.84 days. The overall survival rate at two weeks post-transplant was 98.25% (LD/ CD - 100%/ 94.74% ($p>0.05$)). The overall survival at one to six months post-transplant was 94.44%, 94.23%, 93.88%, 93.48%, 87.5%, and 86.11%, respectively. These survival rates for LD were 97.29%, 97.22%, 97.14%, 96.88%, 96.15%, and 95.45% and CD was 88.24%, 87.5%, 85.71%, 85.71%, 71.43%, and 71.43%. The six-month survival rates of LD vs CD nearly approached statistical significance ($p=0.057$) with a relative risk of death of 6.28 for CD recipients. A noticeable survival decline after 4 months was seen, predominantly among CD recipients. Cadaveric transplant recipients had a higher risk of mortality at six months compared to live donor recipients. Although not statistically significant, likely due to sample size, the clinical trend is clear. The decline in survival beyond four months in the CD group may be related to reduced follow-up and relaxation of post-transplant precautions.

Keywords: *Vascular transplant, Surgery, Renal, Kidney*

Perceptions, behaviours and challenges in health-seeking among blind graduates and undergraduates registered at a specific Disabled Persons Organization (DPO) in Sri Lanka

G. H. D. Ranjuka¹, M. M. T. R. Rathnasiri¹, A. V. S. Ratnatilleke¹, M. R. L. Rauff¹,
D. M. S. Jayawardena²

¹*Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Community Medicine, Faculty of Medicine, University of Colombo, Sri Lanka*

Visual impairment is a growing public health concern. Understanding the visually-impaired population's current perceptions and behaviours in health-seeking and the challenges they face is crucial for ensuring equitable care. Hence, this study was carried out to describe the perceptions, behaviours and challenges faced in health-seeking among blind graduates and undergraduates registered at a specific Disabled Persons Organization (DPO) in Sri Lanka. A descriptive cross-sectional study was conducted among 123 graduates and undergraduates aged 20 to 70 from a selected DPO using simple random sampling. Data were collected via a pre-tested structured questionnaire. SPSS version 20.0 was used for analysis. Response rate was 82%. Majority of the participants (56.1%) had a neutral perception regarding health-seeking. Most (59.3%) did not feel confident to find and access healthcare services independently, while 33.4% had faced discrimination when being treated in hospitals. Of those with chronic diseases, 56.7% sought follow-up care in the government sector. For acute diseases, majority (61.8%) preferred private sector. Majority (63.4%) had good compliance, while 17.8% had poor compliance. Most of them (n = 88, 71.5%) used YouTube to acquire information. Most of them (48.8%) found obtaining healthcare moderately challenging. Majority (70.7%) found it difficult to use public transportation while 53.7% found it difficult to resolve questions they had on health-related topics. Most participants had a neutral perception of healthcare, emphasizing the need to promote positive engagement with healthcare services. Most preferred the private-sector for acute conditions while preferring the government sector for chronic disease follow-up. A majority relied heavily on online sources for health-related information. Furthermore, most participants also found healthcare access moderately challenging, facing difficulties with transportation, and in resolving health-related questions. Hence these facilities should be further optimised to provide better quality care for the blind community and to assist them in overcoming these challenges.

Keywords: *Perceptions, Health-seeking behaviours, Challenges, Visually impaired*

Long-term outcomes of liver transplantation: A single-centre experience in Sri Lanka

J. Arudchelvam, D. Palihakkara, R. Mendis, B. Jayawickrama, R. Cassim, M. Wijeyratne

*Vascular and Transplant Unit, Department of Surgery, Faculty of Medicine, University of Colombo/
National Hospital of Sri Lanka, Colombo, Sri Lanka*

Liver transplantation (LT) is the treatment of choice for severe liver failure. In Sri Lanka, LT is still in its early stages since it was first performed in 2010. This study describes the outcomes of patients who underwent LT since its first introduction in Sri Lanka in 2010. Consecutive LTs performed by the Professorial Vascular and Transplant Unit of the University of Colombo (LTUOC) were included. Data on patient demographics, type of hepatic venous reconstruction, postoperative complications, and clinical outcomes were analysed. Cases with incomplete data were excluded. A total of 23 LTs were included of which 19 (82.65%) were males. The mean age was 51.4 years (range: 35–64 years). The hepatic venous reconstruction techniques used were piggyback (PB) in 15 (65.22%), side-to-side cavostomy in 7 (30.43%), and classic technique in one (4.35%). Hepatic venous outflow obstruction (HVOO) occurred in three (13.04%), all following the PB technique. The mean follow-up duration was 35.2 months (range: 0.2–161.8 months). In this series, side-to-side cavostomy was associated with no occurrences of HVOO, suggesting it may help prevent this complication. The one-year and five-year survival rates were 80.0% and 73.3%, respectively. This outcome is comparable to that of units in their early stages of liver transplantation in other parts of the world.

Keywords: *Liver transplantation, Long-term survival, Hepatic venous outflow obstruction*

Comparison of body image and self-esteem between Yoga and Zumba practitioners of 20-40 years in selected Yoga and Zumba classes in Colombo District

D. K. Amarathunga¹, G. Ponnampuruma²

¹*Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Medical Education, Faculty of Medicine, University of Colombo, Sri Lanka*

Self-esteem and body image are key parts of psychological well-being and self-perception in young adults. Positive self-esteem and body image are linked to improved emotional health, confidence, and quality of life. Physical activity, particularly mind-body exercises like Yoga and Zumba, has been shown to improve these psychological components. However, there is limited comparative research in the Sri Lankan context. The purpose of this study was to compare the impact of Yoga and Zumba on self-esteem and body image among young adults in the Colombo District to identify the most effective type of physical activity for improving body image and self-esteem among young adults. An analytical cross-sectional study was conducted among 120 participants aged 20-40 who had been practicing Yoga (n=60) or Zumba (n=60) for at least three months. Individuals aged 20 to 40 were selected due to the increased social, professional, and appearance-related pressures commonly experienced in this age group. Self-esteem was assessed using the Rosenberg Self-Esteem Scale, and body image was evaluated using the Stunkard Figure Rating Scale. Data were analyzed using SPSS version 23.0, with the chi-square test applied to evaluate group differences. Among 120 practitioners, the mean age was 31.13 (± 6.052), and 81.6% were female. Yoga practitioners showed a significantly greater improvement in self-esteem (71.7%) compared to Zumba practitioners (33%) ($p=0.005$). Additionally, Zumba practitioners showed a significantly higher body image satisfaction (45%) ($p=0.03$) compared to Yoga practitioners. Yoga emphasizes self-awareness, promotes emotional well-being and enhances self-esteem, while Zumba, known for its energetic movements, significantly contributes to a more positive body image. Understanding the effectiveness of these exercises can guide individuals in selecting routines that best support their psychological health.

Keywords: *Self-esteem, Body image, Yoga, Zumba, Psychological well-being*

Exploring functional skills and their correlates in children with Down syndrome: A study from Colombo District, Sri Lanka

K. A. R. B. Kasthuriarachchi¹, U. Liyanage²

¹*Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Anatomy, Faculty of Medicine, University of Colombo, Sri Lanka*

Children with Down syndrome (DS) often face limitations in functional skills, particularly in self-care and social function. This study aimed to investigate functional skills and their relationship with age, gender, and BMI in children with DS aged 4-7 years, at two selected clinical settings in Colombo District, Sri Lanka; the Lady Ridgeway Hospital for Children and the Merrill J. Fernando Charitable Foundation in Moratuwa. A descriptive cross-sectional study was conducted among 52 children, using convenience sampling, to assess functional skills using the Pediatric Evaluation of Disability Inventory (PEDI), which evaluates self-care, mobility, and social function. Demographic information, including age, gender, weight, height, and BMI, was collected through an interviewer-administered questionnaire and physical measurements. Data were analyzed using SPSS version 25.0. The independent sample t-tests, Mann-Whitney U tests, Pearson correlation test, and Spearman's correlation tests were performed during statistical analysis. The mean age of the study group (n=52) was 5.35 ± 1.15 , with 51.9% (n=27) females. The self-care and social function domains had mean scores of 52.52 ± 5.66 and 50.32 ± 5.35 , respectively, while the mobility domain had a higher median score of 61.40. There was a statistically significant relationship between age and self-care ($r=0.274$, $p=0.049$) and age and mobility ($r = 0.420$, $p = 0.002$). There was no statistically significant relationship between age and social function, functional skills and gender, or functional skills and BMI. 55.8% (n=29) fell within the healthy weight range. 73.1% had congenital heart diseases. Also, the study revealed varying degrees of pre-school/school attendance among the participants, with 40.4% (n=21) not enrolled, 34.6% (n=18) attending preschool, and 25% (n=13) attending school. The findings highlight that age played a significant role in developing self-care and mobility skills, whereas gender and BMI didn't significantly correlate with functional skills.

Keywords: *Down syndrome, Functional skills, PEDI, Pediatric Evaluation of Disability Inventory*

Career outcomes and professional pathways of medical graduates: Evidence from the Faculty of Medicine, University of Colombo

J. A. I. Gunasekara¹, C. Liyanage¹, L. Wanninayake¹, P. Yasawardene¹, T. Perera¹,
W. A. G. Wickramasinghe¹, A. de Abrew², I. Karunathilaka², P. Ranasinghe¹

¹*Department of Pharmacology, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Medical Education, Faculty of Medicine, University of Colombo, Sri Lanka*

Sri Lanka has a well-established state-funded medical education system and universal healthcare services. However, recent economic challenges have accelerated the emigration of healthcare professionals. This study aimed to evaluate the long-term career trajectories, migration patterns, postgraduate training, and academic achievements of medical graduates from the Faculty of Medicine, University of Colombo. A cross-sectional tracer study was conducted among graduates from five selected A/L entry cohorts (2001, 2005, 2010, 2013, 2015), representing different stages of career progression. Graduates were traced using batch contact lists, professional and social media networks (LinkedIn, Facebook, WhatsApp), and invited to participate via email or direct messaging. Data were collected using a structured, self-administered online questionnaire. Of 964 eligible graduates, 66.1% (n=637) responded; 51.5% were female. The proportion residing in Sri Lanka declined across cohorts, from 97.4% in AL2015 to 56.7% in AL2001, indicating increasing migration over time. The proportion of specialist consultants was highest in earlier cohorts: 43.9% (AL2001) and 34.9% (AL2005). Overall, 46.5% had completed or were pursuing postgraduate training, with Emergency Medicine (8.1%) and General Medicine (11.5%) being the most chosen specialties. A significant proportion of those migrated (57.6%) had done so after completing postgraduate training. The findings demonstrate a clear trend of late-career migration, particularly after specialization, alongside a strong preference for postgraduate training and specific specialties. These patterns highlight the need for policies aimed at improving retention of trained professionals within the national healthcare system.

Keywords: *Migration, Specialization, Career outcomes, Medical graduates, Tracer*

The relationship between anterior pelvic tilt and pregnancy-related low back pain among pregnant women during their third trimester attending selected government maternity hospitals in the Colombo District

A. C. Weerasinghe¹, I. A. Jayawardane²

¹*Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Obstetrics and Gynecology, Faculty of Medicine, University of Colombo, Sri Lanka*

Pregnancy-related low back pain (LBP) is a common musculoskeletal complaint, especially during the third trimester, often attributed to hormonal, biomechanical, and postural changes such as anterior pelvic tilt (APT). This study aimed to investigate the relationship between APT and pregnancy-related LBP among third-trimester pregnant women attending selected government maternity hospitals in Colombo District, Sri Lanka. A descriptive cross-sectional study was conducted at De Zoysa and Castle Street maternity hospitals, involving 138 pregnant women aged 18–35 years, selected using a convenient sampling method. Data were collected using an interviewer-administered questionnaire to obtain demographic details. Pain severity was assessed using the Visual Analog Scale (VAS), and APT was measured using a pelvic inclinometer. Data analysis was performed using SPSS version 25.0, with Spearman's correlation test applied due to the non-normal distribution of data. Results showed a mean age of 26.41 ± 4.29 years, mean pain severity of 47.9 ± 25.2 mm, and mean APT angle of $13.42^\circ \pm 4.21$. A statistically significant moderate positive correlation ($r = 0.53$, $p < 0.01$) was found between APT and pregnancy-related LBP. The findings suggest that as APT increases, LBP severity also tends to rise.

Keywords: *Pregnancy-related low back pain, Visual Analog Scale, Anterior pelvic tilt, Pelvic inclinometer*

Clinical profile and outcomes of pancreatic fluid collections managed via endoscopic drainage in a tertiary care centre in Sri Lanka

D. Safeer, N. Fernandopulle

Department of Surgery, Faculty of Medicine, University of Colombo, Sri Lanka

Pancreatic fluid collections (PFCs), including pseudocysts (PCs) and walled-off necrosis (WON), are common sequelae of pancreatitis. Endoscopic drainage is increasingly preferred due to its minimally invasive nature. This study aimed to describe the clinical profile, indications, procedural characteristics, and outcomes of patients undergoing endoscopic drainage for PFCs in a tertiary care setting in Sri Lanka. A retrospective analysis was conducted on 76 patients who underwent endoscopic drainage for PFCs. Data were extracted on demographics, etiology of pancreatitis, type of PFC, indication for drainage, use of fluoroscopy, timing of intervention, type of stent used, complications, and follow-up outcomes. Of the 76 patients, 82.9% were male (n=63), with a mean age of 40.8 years. Acute pancreatitis was the predominant etiology (n=51, 67.1%), followed by chronic pancreatitis (n=20, 26.3%). Most collections were PCs (n=63, 82.9%), with WON observed in 17.1% (n=13). The primary indication for drainage was pain (n=48, 63.2%), with other indications including gastric outlet obstruction (n=11, 14.5%) and obstructive jaundice (n=7, 9.2%). Interventions were typically performed at or after four weeks (n=53, 69.7%). Fluoroscopy was used in 81.6% (n=62) of procedures. SEMS were used in 61.8% (n=47) of cases, while plastic stents were used in 38.2% (n=29). Procedure-related complications occurred in 10.5% (n=8) of patients, including infection (n=3, 3.9%), bleeding (n=2, 2.6%), and immediate stent displacement (n=2, 2.6%). Most stents were removed within 4 weeks (n=4, 59.2%), and there were two reported deaths both due to multiorgan failure. Endoscopic drainage of PFCs is a safe and effective intervention with low complication rates when performed at an appropriate interval, preferably beyond four weeks. SEMS were more frequently used and may have contributed to favourable outcomes. Pain was the most common indication, underscoring the role of symptom-driven management. Further prospective studies are warranted to optimize timing and stent choice in resource-limited settings.

Keywords: *Pancreatic fluid collection, Endoscopic drainage*

Comparison of static balance and core endurance between female undergraduate Ballet dancers and Kandyan dancers

A. G. S. H. Perera¹, D. W. N. Dissanayake²

¹*Department of Allied Health Science, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Physiology, Faculty of Medicine, University of Colombo, Sri Lanka*

Dance is a rhythmic movement of the body that enhances physical attributes, especially balance and endurance. Ballet and Kandyan dance, both highly technical and physically demanding, require exceptional postural control, static balance, and core endurance. While Ballet is globally recognized for its athleticism and precision, Kandyan dance, a traditional Sri Lankan form, emphasizes vigorous and unique lower-body movements. This study examines the differences in static balance and core endurance between Ballet and Kandyan dancers, contributing to the understanding of biomechanical demands in these dance forms. This cross-sectional study was conducted among 86 dancers (Ballet=43, Kandyan=43) from the University of the Visual and Performing Arts. Participants were selected through purposive sampling. Socio-demographic characteristic and training time were collected using an interviewer-administered questionnaire. Static balance and core endurance were assessed using the Stork Stand Balance Test and plank test. Descriptive statistics, Independent sample t-test, and Pearson's correlation test were used for statistical analysis. Data were analysed using Statistical Package for Social Science version 30. There was no significant difference in age (Ballet: 24.05 ± 0.69 years, Kandyan: 24.35 ± 0.78 years, $p=0.061$) and body mass index (Ballet: $20.74 \pm 2.80 \text{ kgm}^{-2}$, Kandyan: $20.94 \pm 2.39 \text{ kgm}^{-2}$, $p=0.710$) between the two groups. Ballet dancers demonstrated significantly better static balance compared to Kandyan dancers (Ballet: 57.05 ± 22.37 seconds, Kandyan: 32.09 ± 16.99 seconds, $p < 0.001$). Kandyan dancers exhibited significantly better core endurance compared to Ballet dancers (Ballet: 75.14 ± 37.77 seconds, Kandyan: 93.02 ± 43.69 seconds, $p=0.045$). A strong positive correlation between static balance and core endurance was observed in Ballet dancers ($r = 0.854$; $p < 0.001$), and a moderate positive correlation was found in Kandyan dancers ($r = 0.692$; $p=0.001$). Ballet dancers exhibited superior static balance, while Kandyan dancers demonstrated significantly greater core endurance. These findings reflect the distinct biomechanical demands of each dance style. Understanding such differences can guide tailored training and rehabilitation strategies for dancers to optimize performance and prevent injuries.

Keywords: *Static balance, Core endurance, Ballet, Kandyan*

Knowledge and use of dietary supplements among gym-goers from Colombo District

S. Thuyacontha¹, O. Thuduwege¹, P. Tshomo¹, S. Tshomo¹, S. De Silva Weliange²

¹*Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Community Medicine, Faculty of Medicine, University of Colombo, Sri Lanka*

Gym-goers often seek ways to enhance their well-being and physical performance. As a result, many turn to dietary supplements as a means of augmenting their health and supporting fitness goals, particularly in the face of modern lifestyle challenges that may contribute to non-communicable diseases (NCDs). The widespread availability of dietary supplements and inconsistent regulatory awareness have led to misconceptions and potential misuse. While international studies have explored supplement use among gym-goers, research in Sri Lanka has primarily focused on athletes. Objective of this study is to assess the knowledge and use of supplements among gym-goers from selected gyms in the Colombo District. A descriptive cross-sectional study was conducted among 128 gym-goers across three selected gyms by systematic sampling during peak hours of weekdays and weekends. Data were collected through an interviewer-administered, expert-validated questionnaire covering sociodemographic factors, supplement knowledge and usage. An 18-item tool assessed knowledge as satisfactory or unsatisfactory. Statistical analysis was done using SPSS, applying chi-square tests to assess associations. Knowledge about dietary supplements was satisfactory for 79.7% (n=102) of participants, though understanding of supplement regulation was low. The prevalence of use of dietary supplements was (57.8, n=74), predominantly among males (70.3%, n=54). Multivitamins and minerals were the most commonly used supplements (50%, n=37), followed by proteins and amino acids (47.3%, n=35). Significant associations were found between supplement usage with age and monthly income level. In conclusion, there is a notable prevalence of dietary supplement use, particularly among males. However, significant knowledge gaps remain, especially concerning supplement regulation, highlighting the need for improved education. This could be effectively addressed through targeted workshops or informational sessions held at gyms. Furthermore, providing guidance tailored to individuals' income levels and age groups may help promote more informed and responsible use of supplements.

Keywords: *Supplement use, Gym goers, Knowledge*

Non-Communicable Diseases, cardiovascular risk and factors associated with cardiovascular risk among adults attending a rural hospital in Northern Sri Lanka

M. N. Perera¹, D. M. S. Jayawardene²

¹*National Hospital of Sri Lanka, Ministry of Health, Sri Lanka*

²*Department of Community Medicine, Faculty of Medicine, University of Colombo, Sri Lanka*

Non-Communicable Diseases (NCD) account for 83% of deaths in Sri Lanka, with cardiovascular disease accounting for approximately one-third of NCD-related mortality and is thus a major public health concern. The prevalence of cardiovascular disease is 6.76%. There is limited data regarding NCDs among adults in underserved areas. This study aims to determine the proportion of people with NCDs, to determine the cardiovascular risk according to the World Health Organization cardiovascular risk stratification, and determine the factors associated with cardiovascular risk among adults attending Primary Medical Care Unit (PMCU) Bogaswewa, a rural hospital. Secondary data of 587 villagers who attended the PMCU from a screening programme carried out at the hospital were analyzed. Bivariate (chi-square) and multivariate analysis was carried out to determine the factors associated with cardiovascular risk. A value of $p < 0.05$ was taken as statistically significant. Of the total population 12.1% were newly diagnosed, contributing to an overall NCD prevalence of 58.3%. The majority (67.3%) had a low cardiovascular risk, while 27.2% had a moderate risk, and only 5.5% had a high risk. These were categorized further into two groups as having a low risk (67.3%) and high risk (32.7%), the latter combining both moderate and high risk categories. Bivariate analysis showed that those above 60 years ($p > 0.001$), males ($p > 0.001$), those with positive family history ($p > 0.001$), elevated blood pressure ($p > 0.001$), alcohol consumers ($p = 0.030$), tobacco smokers ($p > 0.001$), betel chewers ($p = 0.017$), leading a sedentary lifestyle ($p = 0.002$) and elevated fasting blood sugar and serum creatinine levels ($p > 0.001$) were at a high risk for cardiovascular disease. Following multivariate analysis age ($p > 0.001$), hypertension ($p > 0.001$), smoking ($p > 0.001$) and fasting blood sugar ($p > 0.001$) were found to be strong predictors of cardiovascular risk. Although most of the rural population had a low cardiovascular risk, the majority were found to have a NCD. This highlights the importance of increased screening, focused risk assessment and targeted interventions for this and other rural communities.

Keywords: *Non-Communicable Diseases, Cardiovascular Risk Stratification, Rural health, Hypertension, Primary care*

A rapid and feasible method for detecting pathogenic *BRCA1/2* variants in breast cancer patients

K. Rajan^{1,2}, K. W. Gunawardena³, N. D. Sirisena¹, V. H. W. Dissanayake^{1,4}

¹*Centre for Genetics and Genomics, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Faculty of Life and Medical Sciences, BMS Campus, Colombo, Sri Lanka*

³*Oxford University Hospitals NHS Foundation Trust, United Kingdom*

⁴*Asiri Centre for Genomic and Regenerative Medicine, Colombo, Sri Lanka*

The global and national incidence rate of breast cancer is rising annually. Approximately 5-10% of breast cancers are hereditary and are caused by genetic mutations. Among the cancer-predisposing genes, *BRCA1* and *BRCA2* are strongly associated with hereditary breast cancers. While several common mutations have been well-characterized, pathogenic single nucleotide variants remain underdiagnosed, particularly in low-resource settings. This study is aimed at developing and optimizing a Tetra Primer-Amplification Refractory Mutation System based PCR (T-ARMS PCR) assay for the accurate and cost-effective screening of four selected pathogenic *BRCA1/2* variants. Three pathogenic variants in *BRCA1* (c.1575del, c.237del, c.5289del) and one in *BRCA2* (c.1296_1297del) were selected for this study. DNA was extracted from the blood samples of a cohort of 44 Sri Lankan hereditary breast cancer patients. Inner and outer primers for each variant were designed manually according to optimum primer parameters published in the literature. The annealing temperature, primer concentration and magnesium chloride concentration were optimized for each variant. Genotyping was performed using the respective optimized protocols, and results were validated using Sanger sequencing for selected samples. Genotyping revealed that one of the samples was positive for the *BRCA1*:c.237del variant, by producing three bands corresponding to a heterozygous genotype, while the remaining samples were negative. All of the samples were negative for other tested *BRCA1/2* variants; c.1575del, c.5289del and c.1296_1297del. It was determined that the generation of only two bands corresponded to the homozygous wild-type genotype. Concordant sequencing results were obtained, which indicated the accurate and reliable use of these T-ARMS PCR assays for genotyping the selected variants. It can be concluded that T-ARMS PCR is a rapid and cost-effective method for targeted screening of rare *BRCA1/2* pathogenic variants. It is beneficial in resource-limited settings as an alternative, but can also be used even when sequencing is available.

Keywords: *BRCA1/2, Genotyping, Hereditary breast cancer, Pathogenic variants, T-ARMS PCR*

A preliminary attempt to analyze the gene expression of DNA polymerases in bladder cancer

R. M. Kamal¹, M. K. Ediriweera², A. P. Malalasekara³, M. Wijewardena⁴, B. Sathesan⁴

¹*Human Genetics Unit, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Biochemistry, Faculty of Medicine, University of Colombo, Sri Lanka*

³*Department of Anatomy, Faculty of Medicine, University of Colombo, Sri Lanka*

⁴*National Hospital, Sri Lanka*

Bladder cancer is the eighth most prevalent cancer in Sri Lanka with a high rate of recurrence and morbidity. The diagnosis of bladder cancer is performed using cystoscopy which is an invasive and uncomfortable procedure. The diagnosis is subsequently confirmed by histopathology. During follow-up, patients undergo routine cystoscopy-based examinations to monitor the disease for recurrence. The primary objective of this preliminary study was to analyze the gene expression of DNA polymerase beta (*POLB*) and DNA polymerase delta 1 (*POLD1*) in bladder cancer with the aim of validating their use as liquid biomarkers. Midstream urine samples were collected from healthy volunteers and patients prior to bladder tumor resection following informed consent. The samples were processed immediately to extract mRNA from the exfoliated urothelial cells. The difference in gene expression of *POLB* and *POLD1* between healthy and cancerous states were analyzed using two-step reverse transcriptase quantitative PCR (qPCR). The fold difference in their expression was calculated against the reference gene glyceraldehyde-3-phosphate dehydrogenase (*GAPDH*). The *POLB* gene showed an overexpression in patients affected with bladder cancer. The mean fold difference in patient samples was 6.67 compared to the 1.19 of healthy samples. The results were significant at a $p < 0.05$. The data obtained for *POLD1* were inconclusive. The study demonstrates the overexpression pattern of *POLB* in the exfoliated urothelial cells in patients with bladder cancer. These findings validate the potential of utilizing *POLB* expression as a biomarker in non-invasive diagnostic and prognostic tests for bladder cancer. This study is the first of its kind to analyze gene expression of bladder cancer cells in Sri Lanka.

Keywords: *Bladder cancer, DNA polymerase beta, DNA polymerase delta, Gene expression*

Prevalence and risk factors of neck and shoulder pain among G.C.E. Ordinary Level (O/L) students in two selected schools in Batticaloa District, Sri Lanka

M. B. F. Nisfa¹, C. Liyanage²

¹*Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Pharmacology, Faculty of Medicine, University of Colombo, Sri Lanka*

Neck and shoulder pain is a common musculoskeletal complaint among adolescents, with a possible increase in prevalence due to change in lifestyle and use of devices. This study is aimed to assess the prevalence and associated factors of neck and shoulder pain among G.C.E. Ordinary Level (O/L) students in two selected schools in Batticaloa District, Sri Lanka. A descriptive cross-sectional study was conducted among students in grades 10 and 11 in two selected schools in Batticaloa District. Total sampling of the population was done and data were collected using a self-administered questionnaire which included the questionnaire for Screen Time of Adolescents, Physical activity questionnaire for Adolescents, Strengths and Difficulties Questionnaire and Standardized Nordic Musculoskeletal Questionnaire. Weight, height of participants and the weight of the school bag were measured. Data were analyzed using SPSS version 24.0 with descriptive statistics and chi-square test. Of the 337 respondents, 63.8% and 45.1% reported neck pain and shoulder pain respectively during the last 12 months, and 19.6% and 27.9% reported current neck and shoulder pain respectively. Significant associations were noted between screen time for studying ($p=0.002$) and browsing the internet ($p=0.001$), physical activity ($p=0.001$), desk height ($p=0.002$), method of carrying school bag ($p=0.005$), method of travel to school ($p=0.001$), body mass index ($p=0.014$) and neck and/or shoulder pain. Screen time for watching videos, playing video games, and social media usage, chair comfort, seeing blackboard, school bag weight, duration of carrying school bag and psychosocial factors were not significantly associated with neck and/or shoulder pain. Neck and shoulder pain is highly prevalent among G.C.E. (O/L) students. Screen time, physical activity, classroom furniture, school bag carriage variables, and body mass index are potentially modifiable risk factors among G.C.E. (O/L) students. Interventions addressing these factors are recommended.

Keywords: Neck and shoulder pain, Screen time, G.C.E. (O/L) students

Association between musculoskeletal pain and health-related quality of life among male stone quarry workers in Kaduwela Municipal area Colombo District, Sri Lanka

M. K. H. P. Senarath, A. H. Wettasighe

Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka

Musculoskeletal (MSK) pain is a common occupational health issue among stone quarry workers. These quarries, located in rocky areas, extract stone manually or mechanically to provide affordable construction materials, often supporting communities affected by poverty and unemployment. Typical job roles include blasters, drillers, excavators, manual labourers, and machine operators. This study aimed to examine the relationship between MSK pain severity and health-related quality of life (HR-QOL) among stone quarry workers in selected quarries within the Kaduwela Municipal area, Colombo District, Sri Lanka. A descriptive cross-sectional study was conducted among 180 male stone quarry workers with at least one year of experience. Participants were selected using a two-stage random sampling method. Data collection was done through interviewer-administered questionnaires. The Nordic Musculoskeletal Questionnaire assessed MSK pain, pain intensity was measured using the Numerical Pain Rating Scale, and HR-QOL was evaluated using the Short Form-36 (SF-36). Spearman's correlation test was used to analyze the association between MSK pain and HR-QOL. The majority of participants (60%, $n = 108$) reported MSK pain in one or more body regions during the past 12 months. A significantly negative correlation was found between MSK pain and both the physical ($p < 0.001$, $\rho = -0.450$) and mental ($p = 0.009$, $\rho = -0.194$) component summaries, indicating reduced HR-QOL. MSK pain showed a weak but significant negative correlation with general health, physical functioning, emotional well-being, social functioning, and the mental component summary. A moderate but significant negative correlation was observed between MSK pain and role limitations due to physical health, role limitations due to emotional problems, bodily pain, total score, and the physical component summary. MSK pain adversely affects both physical and mental aspects of HR-QOL. Ergonomic modifications are essential to enhance worker health, efficiency, and satisfaction.

Keywords: *Musculoskeletal pain, Stone quarry workers, Health-related quality of life*

A pilot study on the evaluation of the genotoxic effects of betel quid on human buccal cells using the DNA comet assay in a Sri Lankan cohort

G. S. C. Prabhashani, C. Udukumbura, H. W. Dilanthi, M. D. M. Fernando

Center for Natural Product Research and Biotechnology for Integrative Health, Department of Biochemistry and Molecular Biology, Faculty of Medicine, University of Colombo, Sri Lanka

Betel quid (BQ) chewing, a prevalent habit in South Asia, is classified as a Group I carcinogen for oral cancer (OC). In Sri Lanka (SL), 92% of tea estate workers are habitual BQ chewers and exhibit a threefold increased risk of developing OC. Despite this, direct evidence of BQ-induced DNA damage in buccal epithelial cells remains limited, particularly within the Sri Lankan population. This pilot study aimed to assess the genotoxic effects of BQ in human buccal cells using the Comet assay (CA), which is a widely used technique to detect genotoxicity by DNA damage in eukaryotic cells. The cross-sectional study included 30 adults (15 BQ chewers and 15 non-chewers) aged > 18 years, from Maradana, Sri Lanka. Ethical approval was obtained from the Ethics Review Committee, Faculty of Medicine, University of Colombo. Buccal cells were collected, and DNA damage was quantified via comet tail length (TL). Statistical analysis was performed using independent t-tests and ANOVA. Significantly higher levels of DNA damage were observed in BQ chewers (mean TL: 34.49 ± 1.32 px) compared to non-chewers (13.93 ± 0.64 px; $p < 0.001$), confirming BQ's genotoxic potential. No significant differences in TL were observed based on age, gender, smoking status, or tobacco co-use ($p > 0.05$). Despite variability in chewing frequency (daily: 40%; weekly: 6.67%; monthly: 33.3%; occasionally: 20%) and duration (mean: 5 years), no dose-response relationship was detected, possibly due to sample size limitations. The CA effectively detected genotoxicity among habitual BQ chewers in the group, even in the absence of clinical lesions. These findings support the utility of CA for early risk assessment in high-risk populations. Given the established association between BQ use and oral precancerous lesions, urgent public health measures are needed to promote BQ cessation and reduce the OC burden.

Keywords: *Betel quid, Genotoxicity, Comet assay, Oral cancer, Sri Lanka*

Development of laboratory protocols for detecting epigenetic variants *TET2* c.4210C>T (Arg1404Ter) and *TET2*c.822del (Asn275fs) and study their prevalence in a Sri Lankan Myeloproliferative Neoplasm cohort

W. P. U. S. Weerasinghe¹, S. T. Karunathilake¹, N. N. H. Costha¹, N. Amarasinghe²,
Y. J. Costa², H. W. W. Goonasekera¹

¹*Center for Genetics and Genomics, Department of Anatomy, Genetics and Biomedical Informatics,
Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Haematology, Colombo North Teaching Hospital, Ragama, Sri Lanka*

Epigenetic variants influence prognosis in myeloproliferative neoplasms (MPN) and their prevalence studies are warranted to enable personalised medicine. Next-generation sequencing platforms limit *TET2* variant profiling due to high cost. A cost-effective, easy to implement genetic testing method would benefit Sri Lankan MPN patients. This study aimed at developing a PCR based protocol and study the prevalence of two Asian specific *TET2* variants; c.4210C>T (Arg1404Ter)[rs974106601] and c.822del (Asn275fs)[rs777145283]. Ethical approval (EC-24-149) was obtained for a descriptive study of patients diagnosed with polycythaemia vera (PV), essential thrombocythaemia (ET), and primary myelofibrosis (PMF) attending the Haematology Clinic, North Colombo Teaching Hospital. Pathogenic variant selection was done using Genome Aggregation and VarSome databases. Genomic DNA was extracted from peripheral blood. Tetra-primer ARMS-PCR, primers were manually designed using the NCBI dbSNP database. Specificity was confirmed through UCSC *in-silico* PCR, to avoid non-specific amplification. Primer optimization included temperature, MgCl₂, and primer-ratio gradients to identify ideal annealing and primer concentrations. The finalized PCR protocol was used for variant detection, followed by agarose gel electrophoresis. Results were validated using Sanger sequencing. Statistical analysis was conducted using IBM SPSS Statistics version 19. Samples from 50 long-standing (mean time since diagnosis 10.8 years), treated (100% on treatment), MPN patients were analysed; PV-82% (n=41), ET-10% (n=5), PMF-8% (n=4). The number of patients on remission: 44% (n=22). The optimised Tetra-primer ARMS-PCR results were compatible with Sanger sequencing results. Prevalence for both variants: wild-type 100% (n=50), variant detection rate-0%. A validated, low-cost PCR-based protocol was successfully developed to detect two *TET2* variants, which can be applied for broader *TET2* variant profiling. This first reported study of *TET2* variants in a Sri Lankan MPN cohort showing absence of variants, could reflect low prevalence of these variants in local MPN or clonal deletion following therapy. Larger MPN-population-based studies at diagnosis are recommended, to validate these findings.

Keywords: *Sri Lankan Myeloproliferative neoplasms, TET2*c.4210C>T (Arg1404Ter), *TET2*c.822del (Asn275fs), Tetra-primer ARMS-PCR

Prevalence and genotype-phenotype correlation study of *ASXL1* variants c.1773C>G(Tyr591Ter) and c.1282C>T(p.Gln428Ter) in a Sri Lankan Myeloproliferative Neoplasm cohort

S. T. Manamperi¹, S. T. Karunatilake¹, N. N. H. Costha¹, N. Amarasinghe², Y. J. Costa²,
H. W. W. Goonasekara¹

¹*Center for Genetics and Genomics, Department of Anatomy, Genetics and Biomedical Informatics,
Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Haematology, Colombo North Teaching Hospital, Ragama, Sri Lanka*

Molecular insights into *ASXL1* gene variants are valuable for the diagnosis and prognosis of myeloproliferative neoplasms (MPNs). Their prevalence varies across ethnicities, with limited data available for South Asian populations. This study investigated two Asian-specific *ASXL1* variants—c.1773C>G (p.Tyr591Ter) and c.1282C>T (p.Gln428Ter)—and assessed genotype–phenotype correlations in a Sri Lankan MPN cohort. Fifty patients from a tertiary care hospital in North Colombo were recruited following ethical approval (EC-24-150). Variant selection was based on Genome Aggregation and VarSome databases. Detection was performed using Tetra-primer ARMS-PCR, with a modified touchdown PCR protocol for the c.1282C>T variant. Results were validated through Sanger sequencing and analyzed using IBM SPSS Statistics 19. Of the cohort (PV: 82%, ET: 10%, PMF: 8%; male:female ratio 2.3:1; mean age 56 years), the c.1773C>G variant was identified in 12% (n=6, all heterozygous) and was present across all MPN subtypes. The c.1282C>T variant was not detected in any patient. ARMS-PCR results were consistent with Sanger sequencing. No statistically significant genotype–phenotype correlations were observed, though trends included lower hemoglobin and higher platelet counts in variant-positive patients. This is the first report of the c.1773C>G variant in Sri Lankan MPNs. The absence of the c.1282C>T variant may reflect its rarity or post-treatment clonal loss. The development and validation of cost-effective ARMS-PCR protocols for *ASXL1* variant screening represent a significant step toward personalized MPN management in South Asia. Larger studies are warranted to confirm these findings.

Keywords: *Sri Lankan Myeloproliferative Neoplasms, ASXL1c.1773C>G(Tyr591Ter), ASXL1c.1282C>T(Gln428Ter), Tetra-primer ARMS-PCR, Touchdown-PCR*

The socio-economic determinants of food choices and dietary habits among adolescents in urban Sri Lanka: A cross-sectional study

C. Gamachchige¹, M. Fonseka¹, O. Fonseka¹, D. Gamage¹, N. Chandraratne²

¹*Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Community Medicine, Faculty of Medicine, University of Colombo*

Adolescence is a crucial period in life to form lifelong dietary habits which can have lasting effects on their health in later life. In urban areas, adolescents suffering from both undernutrition and overweight or obesity due to various factors is a critical public health concern. This study assessed the socio-economic factors affecting food choices and habits of adolescents in Colombo, Sri Lanka. A cross-sectional study was conducted among 182 from two schools in Colombo. Eating habits and food choices, socio-demographic and economic factors and knowledge on nutrition were assessed using a face and content validated self-administered questionnaire. A scoring system was used for food consumption based on which the students were categorized into having healthy and unhealthy food choices. Chi-squared test and Fisher's exact test were used to explore categorical variables and Pearson correlation coefficient for continuous variables. The significance level was set as $p < 0.05$. Out of the study population, 54.4% students had healthy food choices while 45.6% did not. Almost 89% of the respondents considered cost when buying food and more than half (55.5%) skipped breakfast, due to financial issues and time constraints. Around 26.11% stated that the food options available at school were unhealthy. Neither father's occupation ($p=0.260$) nor pocket money ($p=0.792$) showed significant association with the food choices. Social determinants such as family discussions ($p=0.004$) and emphasis around healthy nutrition ($p=0.048$) and religious practices ($p=0.003$) were positively associated with healthy food choices. The socio-economic factors along with the limited food availability limits adolescents in Sri Lanka to access healthy foods. Thus, public health strategies need to prioritize economic support with improved affordability and availability of healthy food choices and enhanced involvement from families and schools to reduce malnutrition among adolescents.

Keywords: *Adolescent nutrition, Malnutrition, Cost, Public health, Food availability*

The association of nutritional knowledge with food choices and dietary habits of adolescents in urban Sri Lanka

D. Gamage¹, C. Gamachchige¹, M. Fonseka¹, O. Fonseka¹, N. Chandraratne²

¹*Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Community Medicine, Faculty of Medicine, University of Colombo, Sri Lanka*

Knowledge on nutrition is a key factor in promoting healthy eating behaviours among adolescents. However, even with satisfactory knowledge, it has become a challenge to put that knowledge into practice especially in urban Sri Lankan settings where numerous factors affect food choices. The study assessed the association of knowledge on nutrition with food choices and eating habits among adolescents in Colombo, Sri Lanka. A cross-sectional study was conducted among 182 students from two schools in Colombo. Eating habits and food choices, socio-demographic and economic factors and knowledge on nutrition were assessed using a face and content validated self-administered questionnaire. A scoring system was used for knowledge on nutrition based on which the students were categorized into having satisfactory and unsatisfactory food choices by a predetermined cut-off. Similarly, the respondents were classified into having healthy and unhealthy food consumption. Chi-squared test and Fisher's exact test were used to explore categorical variables and Pearson correlation coefficient for continuous variables. The significance level was set as $p < 0.05$. Out of the study population, only 45.1% had satisfactory knowledge on nutrition while 54.9% were found to have unsatisfactory knowledge on nutrition. Knowledge on nutrition of students was found to be significantly associated with their gender ($p < 0.001$), family influence ($p < 0.001$) and their personal preferences ($p = 0.044$) but showed no significant correlation with actual healthy food consumption ($p = 0.332$). Despite relatively adequate knowledge on nutrition, many had unhealthy food consumption, indicating a gap between knowledge and practice. Although many urban Sri Lankan adolescents have an adequate understanding of nutrition, it was not associated with healthy eating habits. Hence it is of importance that public health strategies focus not only on nutrition education but also on enhancing psychological well-being, promoting media literacy, and developing practical skills such as meal planning and healthy food preparation.

Keywords: *Nutritional knowledge, Adolescents, Food choices, Public health, Eating habits*

Assessment of the medication safety practice package developed and implemented among pharmacists in a tertiary care hospital

G. R. W. S. K. Bandara^{1,3}, P. Galappaththy², S. Kiriwandeniya³, N. Samaranayake⁴

¹*Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Pharmacology, Faculty of Medicine, University of Colombo, Sri Lanka*

³*Colombo South Teaching Hospital, Kalubowila, Sri Lanka*

⁴*Department of Pharmacy and Pharmaceutical Sciences, Faculty of Allied Health Sciences, University of Sri Jayewardenepura, Sri Lanka*

Medication errors pose significant risks in healthcare. This study piloted the implementation of a medication safety practice package (MSPP) for pharmacists, addressing key factors responsible for errors. An eight component MSPP was developed through studies conducted among pharmacists and patients, considering key medication safety aspects and was finalized during consultative meetings. The package comprised: a High-Alert Medicine (HAM) list with Error Prevention Strategies (EPS), Look-Alike-Sound-Alike (LASA) medicine list with EPS, Error-Prone Abbreviation (EPA) list with EPS, templates for dispensing labels for all pre-packed medicines in local languages, guidelines for patient education and counselling including patient information leaflets (PILs) for 10 HAMs, guidelines for safety in polypharmacy, medication reconciliation and reporting of medication incidents. The MSPP was distributed among all pharmacists (N=45) in a tertiary care hospital and implementation was evaluated using a structured, interviewer-administered questionnaire assessing awareness, acceptability, and adherence to the recommendations after one year. Awareness about the components of the MSPP were; HAM (95.6%), LASA medicines (84.4%), EPA (84.4%), patient education and counselling (64.4%), polypharmacy (70.5%), medication reconciliation (68.9%), and incident reporting (93.3%). Self-reported adherence to recommendations was 100% for HAM, LASA and medicines labelling. Counselling for first visit patients was done by 95.6%. Being cautious on polypharmacy was reported by 60% and medication reconciliation by 91.1%. Although 77.7% knew the procedure of reporting, none had reported incidents. The main barriers to implementing the MSPP were a heavy workload (86.7%), high patient volumes (77.8%), inadequate staffing (91.1%), poor patient health literacy (95.6%), and the absence of a separate patient counseling area (97.8%). This pilot study showed the feasibility of implementing eight components of the MSPP despite these barriers. Reducing workload and increasing the number of staff would support implementation. Incident reporting culture needs improving to learn and prevent errors. The MSPP can be extended to other hospitals.

Keywords: *Medication safety, Polypharmacy, Incident reporting, LASA medicines, HAM*

Knowledge and practices on screen time use and the association between screen time use and social intelligence of G.C.E Advanced Level students of selected boys' schools in the Colombo District

M. P. M. Perera¹, M. P. J. Perera¹, M. I. S. D. Perera¹, A. de Abrew²

¹*Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Medical Education, Faculty of Medicine, University of Colombo, Sri Lanka*

Excessive screen time has been linked to various health issues such as visual defects, headaches, and sleep disturbances. International studies also reveal associations with violence, antisocial behaviour, and lack of empathy. Social intelligence is the ability to understand, manage, and interact effectively with others using social skills and social cues in diverse situations. Despite its significance for academic and personal success, research on the impact of screen time on social intelligence remains limited. This study assesses knowledge and practices related to screen time, and the association between self-reported screen time and social intelligence among Advanced Level students in selected boys' schools in the Colombo District. A descriptive cross-sectional study with an analytical component was conducted among 263 conveniently sampled students using a structured, self-administered questionnaire. Socio-demographic data and knowledge about screen time use were collected using an expert-validated tool. Students self-reported screen use, we categorized into use for academic and non-academic (leisure) purposes. Each was further classified as above or below the median of the cohort. Social intelligence was assessed using the Tromsø Social Intelligence Scale. Associations were analysed using independent sample t-tests via SPSS. Most students used smartphones at home (97.7%, n=257), and displayed good (60.1%, n=158), and very good (27.4%, n=72) knowledge about screen time use. Majority (68.4%, n=180) were aware of recommended recreational screen time limits. Mean total screen time was 8 h 6 min/day (academic: 3 h 39 min; non-academic: 4 h 26 min). Mean social intelligence score was 102.5, with no statistically significant association between total screen time and social intelligence (p=0.933). Although knowledge scores were good, students reported high screen time use for non-academic purposes. Limits should be placed on smartphone use, and interventions should be introduced to manage excessive recreational screen time.

Keywords: *Screen time, Social intelligence, Knowledge, Adolescents*

Emotional intelligence, empathy and their associations among medical undergraduates in Sri Lanka

D. R. Hemasinghe¹, H. A. N. Hansika¹, H. P. P. D. Heiyanthuduwa¹, G. Ponnampuruma²

¹*Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Medical Education, Faculty of Medicine, University of Colombo, Sri Lanka*

Emotional intelligence (EI) and empathy are essential attributes for medical professionals, playing critical roles in doctor–patient communication, teamwork, and resilience. Despite growing global interest, there is limited local data on the levels and inter-relationships of these competencies among Sri Lankan medical undergraduates. This study aimed to assess EI and empathy levels among medical students from selected academic years, and to examine their associations with socio-demographic and behavioural factors. A descriptive cross-sectional study with an analytical component was conducted among 130 medical undergraduates from 3 batches at the Faculty of Medicine, University of Ruhuna. Participants were recruited by stratified sampling and completed an online self-administered questionnaire after giving informed consent electronically. The tool comprised a socio-demographic section, the Quick Emotional Intelligence Self-Assessment, and Davis's Interpersonal Reactivity Index (IRI), both previously validated for South Asian undergraduate populations. Questionnaires were administered in English, the medium of instruction at the faculty. Descriptive statistics were calculated, and associations were tested using chi-square, independent t-tests, and one-way ANOVA. The mean EI score was 111.5 ± 17.5 (out of 160), and the mean empathy score was 71.6 ± 12.4 (out of 112). Males demonstrated significantly higher EI scores in emotional management ($p=0.016$) and relationship management ($p=0.003$), whereas females showed higher total empathy scores ($p=0.003$). Higher EI scores were associated with satisfaction in studying medicine ($p<0.001$), engagement in extracurricular activities ($p=0.015$ for social emotional awareness; $p=0.014$ for relationship management), and higher income category ($p=0.018$ for social emotional awareness; $p=0.038$ for relationship management). Notably, students dissatisfied with studying medicine recorded higher mean empathy scores ($p=0.009$). EI and empathy were positively correlated. These findings suggest that both EI and empathy are shaped by individual and contextual factors in medical students, underscoring the need to incorporate structured opportunities for emotional skill development within the medical curriculum to support students' interpersonal competencies and emotional well-being.

Keywords: *Emotional intelligence, Empathy, Medical students, Sri Lanka, Undergraduate education*

The influence of balance ability on prosthetic mobility and social activity among individuals with a unilateral lower extremity amputation attending to Colombo Friend in Need Society

P. P. Chamika, D. G. S. K. L. Jayawardana

Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka

Balance ability plays a critical role in prosthetic mobility and social activity among individuals with a unilateral lower extremity amputation. While balance training is a key component of rehabilitation, the specific influence of balance ability on functional mobility and social participation remains underexplored. This study aimed to assess the relationship between balance ability and both prosthetic mobility and social activity among individuals with a unilateral lower extremity amputation attending the Colombo Friend in Need Society. A cross-sectional study was conducted among 81 individuals with a unilateral lower extremity amputation. Balance ability was assessed using the Berg Balance Scale (BBS). Prosthetic mobility capability was measured using the Prosthesis Evaluation Questionnaire – Mobility Section, prosthetic mobility performance using the Houghton Scale, and social activity using the Frenchay Activities Index. Descriptive statistics and Spearman's correlation test were used for statistical analysis. The study included 81 participants (81.5% male), aged 18–60 years (mean age 48.07 ± 12.10). The average score on the BBS was 51.64 ± 9.04 . Participants demonstrated varying levels of prosthetic mobility capability (mean: 37.66 ± 7.10), performance (mean: 9.67 ± 2.15), and social activity (mean: 35.03 ± 7.14). The results revealed a significant moderate positive correlation between balance ability and prosthetic mobility capability ($r=0.324$, $p=0.003$), along with a strong positive correlation with prosthetic mobility performance ($r=0.560$, $p<0.001$). Furthermore, a moderate positive correlation was identified between balance ability and social activity ($r=0.465$, $p<0.001$). The results suggest that balance ability is crucial for improving prosthetic mobility and social participation in individuals with unilateral lower limb amputation. These findings highlight the importance of incorporating targeted balance training into rehabilitation programmes to enhance mobility outcomes and overall quality of life.

Keywords: *Balance ability, Prosthetic mobility, Social activity, Unilateral lower extremity amputation, Rehabilitation*

Estimation of postmortem interval using vitreous humor electrolyte concentrations in natural deaths within Sri Lankan population

Y. Mulleriyawa¹, M. S. K. Rabindrakumar¹, K. M. Mulleriyawa², N. A. Mendis³

¹*Department of Life Sciences, Faculty of Science, NSBM Green University, Sri Lanka*

²*Department of Forensic Medicine, District General Hospital, Avissawella, Sri Lanka*

³*Department of Forensic Medicine and Toxicology, Faculty of Medicine, University of Colombo, Sri Lanka*

Estimating the postmortem interval (PMI) is vital in forensic investigations, and vitreous humor analysis is a promising method due to its anatomical protection and postmortem stability. However, no studies have yet been conducted in Sri Lanka. This study aimed to evaluate the distribution and association between PMI and the concentrations of potassium, sodium, and chloride in the vitreous humor of deceased individuals in the Avissawella region of Sri Lanka. The study was approved by Ethics Review Committee, Faculty of Medicine, Colombo (EC-24-097). A facility-based cross-sectional study was conducted at the mortuary of the District General Hospital, Avissawella, from December 2024 to February 2025. Vitreous humor samples were collected from 30 natural death cases with known PMI, satisfying the Central Limit Theorem of sample calculation, due to the short study duration and limited literature in Sri Lankan Region. Vitreous humor samples of 1 mL were collected from each eye during medico-legal autopsies using a scleral puncture technique under sterilized conditions and analyzed immediately using an ion selective electrode (ISE). The mean vitreous concentrations of potassium, sodium and chloride were 13.8 ± 4.26 , 135.8 ± 6.75 and 107.8 ± 7.18 mmol/L, respectively. We found a significant positive correlation between PMI and vitreous potassium ($r = 0.740$, $p < 0.001$), and a negative correlation with sodium ($r = -0.454$, $p < 0.05$). No significant association was seen with chloride ($r = -0.128$, $p > 0.05$). No association was obtained between vitreous potassium and age, gender, cause of death, and eye orientation. A regression equation: $\text{PMI (hours)} = 2.08 \times [\text{K}^+ \text{ (mmol/L)}] - 12.82$, was developed between PMI and vitreous potassium concentrations despite the limited number of samples. This preliminary study provides the first Sri Lankan data supporting vitreous potassium as a promising biochemical marker for PMI estimation. Further research with larger, more diverse samples is recommended.

Keywords: *Postmortem Interval, Forensic medicine, Vitreous humor, Potassium, Electrolytes*

A descriptive study of the genetic basis of rare undiagnosed disorders in a cohort of Sri Lankan patients

D. Hettiarachchi^{1,2}, H. G. C. K. Samarasekera¹, D. P. B. Hendalage¹, N. F. Neththikumara¹,
G. B. M. Adeshika^{1,2}, T. K. Wetthasinghe^{1,2}, H. W. W. Goonasekera^{1,2}, N. D. Sirisena^{1,2},
V. H. W. Dissanayake^{1,2}

¹*Center for Genetics and Genomics, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Anatomy, Genetics and Biomedical Informatics, Faculty of Medicine,
University of Colombo, Sri Lanka*

Whole Exome Sequencing (WES) is a powerful tool for identifying the genetic basis of rare, undiagnosed disorders. It has reduced the diagnostic odysseys associated with such conditions and has replaced single gene and gene panel testing. This study describes the genetic findings in patients who underwent WES at the Center for Genetics and Genomics, Faculty of Medicine, University of Colombo. A prospective database of genotypic and phenotypic data from patients tested between November 2014 and April 2025 was retrospectively analyzed. Next Generation Sequencing was performed on an Illumina platform on patients referred due to a rare, undiagnosed disorder. Of 724 patients sequenced, the male-to-female ratio was 1.1:1, with ages ranging from neonates to 79 years. A definitive genetic diagnosis was established in 452 patients (62.4%), and 154 (21.3%) harboured novel variants. System-wise breakdown is as follows (number referred, diagnosed [%], novel variants): Multisystemic presentations: 226, 144 (63.7%), 50, Neurological: 174, 106 (60.9%), 37, Musculoskeletal: 69, 52 (75.4%), 17, Endocrine: 34, 20 (58.8%), 6, Renal: 24, 14 (58.3%), 6, Cardiovascular: 19, 12 (63.2%), 1, Eye: 19, 17 (89.5%), 7, Metabolic: 19, 13 (68.4%), 5, Blood/lymphoreticular: 13, 7 (53.8%), 2, Skin: 8, 5 (62.5%), 3, Gastrointestinal: 6, 3 (50%), 0. Among those with a confirmed diagnosis, 88 (71.5%) were from consanguineous families with 22 novel variants. WES enabled a molecular diagnosis in more than half of this cohort, demonstrating its clinical value in accelerating diagnosis which helped in guiding management, and identifying novel disease-causing variants in rare disorders.

Keywords: *Rare and undiagnosed disorders, Whole Exome Sequencing, Novel variants*

Association of upper limb lymphedema with handgrip strength, balance, and gait mobility in women following mastectomy: A cross-sectional study at the National Cancer Institute, Sri Lanka

K. D. Wijesinghe, D. G. S. K. L. Jayawardane

Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka

Upper limb lymphedema (ULL) is a common post-mastectomy complication, characterized by swelling, pain, and discomfort in the arm, which subsequently diminishes patients' quality of life. This condition is attributed to the blockage or disruption of lymphatic vessels due to breast cancer treatments, resulting in fluid accumulation in the affected arm. This study aimed to assess ULL, handgrip strength, balance, and gait mobility among post-mastectomy women with ULL and to explore the associations between ULL and these functional outcomes. A descriptive cross-sectional study was conducted, recruiting 64 women aged 18-60 with unilateral ULL within one year post-mastectomy, from the National Cancer Institute, Maharagama. ULL was assessed using the inter-limb volume (ILV) ratio derived from circumferential measurements. Handgrip strength and gait mobility were evaluated using a handheld dynamometer and the Timed Up and Go (TUG) test, respectively. Balance was measured with the Single Leg Stand Test (SLST) and Fullerton Advanced Balance Scale (FABS). Correlations were analyzed using Spearman's correlation in SPSS v22. Participants exhibited a mean ILV ratio of $29.55 \pm 13.28\%$. The mean handgrip strength was 7.42 ± 5.00 kgf (affected side) and 10.05 ± 4.24 kgf (unaffected side). Mean SLST times were 19.06 ± 15.38 seconds (eyes-open) and 4.90 ± 2.08 seconds (eyes-closed) with a mean FABS score of 32.05 ± 5.28 . The mean TUG test time was 15.79 ± 3.81 seconds. No significant correlation was observed between ILV ratio and handgrip strength (affected side: $r_s = -0.039$; unaffected side: $r_s = -0.218$; $p > 0.05$). However, ILV ratio correlated negatively with SLST (eyes-open: $r_s = -0.394$, $p = 0.001$; eyes-closed: $r_s = 0.296$, $p = 0.018$) and FABS scores ($r_s = -0.285$, $p = 0.023$), and positively with TUG ($r_s = 0.305$, $p = 0.014$). ULL is not significantly associated with handgrip strength. However, it showed a significant negative impact on the balance and gait mobility of post-mastectomy women. Thus, rehabilitation should address both lymphedema reduction and improving the balance and mobility to improve functional capacity in these individuals.

Keywords: *Mastectomy, Lymphedema, Handgrip strength, Balance, Mobility*

Self-reported prevalence and risk factors associated with low back pain among male university athletes in the Colombo District

M. L. R. K. Fonseka¹, S. Weerasinghe²

¹*Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Sports Science, Faculty of Applied Sciences,
University of Sri Jayewardenepura, Sri Lanka*

Low back pain (LBP) is a prevalent musculoskeletal issue among athletes, often influenced by sport-specific demands and individual risk factors. To our knowledge, no previous studies have examined the prevalence and factors associated with LBP among university-level male athletes in Colombo. This study aimed to identify the self-reported prevalence and risk factors associated with LBP among male university athletes in the Colombo District. A cross-sectional study was conducted on male university athletes in the Colombo District playing football, rugby, basketball, and volleyball. The study sample comprised 296 athletes with a mean age of 22.49 ± 1.30 years with at least one year of university-level sports participation. Data on LBP prevalence, demographics, lifestyle factors, and training characteristics were collected through a structured questionnaire. A logistic regression model was used to determine the risk factors associated with LBP in participants. The results revealed that the 12-month prevalence of LBP was 62.5% whereas the lifetime and point prevalence were 73.6% and 20.3%, respectively. The distribution of LBP prevalence among sport types was as follows: football (19.0%), rugby (22.0%), basketball (14.0%) and volleyball (24.2%). Results showed that LBP led to a relatively high absence rate from training sessions (66.5%), competitions (20.5%) and classes (22.7%). Logistic regression analysis revealed that risk factors, such as age, body height, body weight, years of experience, training hours per day and week, level of competition, and smoking, were not statistically significant predictors ($p > 0.05$) of LBP among the studied university athletes. LBP is highly prevalent among university athletes in the Colombo District, affecting sports and academic work. Potential risk factors, including age, experience, training duration and level of competition, did not have significant associations with LBP. Our findings indicate the necessity for specific prevention programmes and early interventions to reduce the prevalence and impact of LBP.

Keywords: *Low back pain, University athletes, Self-reported prevalence, Risk factors*

Prevalence of musculoskeletal pain and its association with body mass index and physical activity level among patients with type 2 diabetes mellitus at the National Hospital of Sri Lanka

C. D. Ranneththige¹, H. D. Wijesinghe²

¹*Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Pathology, Faculty of Medicine, University of Colombo, Sri Lanka*

Musculoskeletal (MSK) complications are prevalent in individuals with type 2 diabetes mellitus (T2DM). This study sought to assess the prevalence of MSK pain, its association with body mass index (BMI) and physical activity and identify the most affected body regions among patients with T2 DM at the Diabetes Clinic of the National Hospital of Sri Lanka (NHSL). This descriptive cross-sectional study involved 297 participants with T2DM, recruited using systematic random sampling from the NHSL Diabetes Clinic. It included both genders aged 18-69 diagnosed with T2DM for at least one year. Data were collected via self-administered questionnaires, using the Nordic Musculoskeletal Questionnaire for MSK pain assessment and the International Physical Activity Level Questionnaire (IPAQ-SF) for physical activity levels. Height and weight measurements were used to calculate BMI, and data analysis utilized descriptive statistics and chi-square tests. Most participants (78%) reported experiencing MSK pain in the past week or past year, with the knee joint being the most affected (52.5%, n=156). Chi-square tests indicated a significant link between BMI and MSK pain over the past year, as well as knee pain in the past week and past year. However, physical activity levels were not significantly associated with MSK pain in any region during those timeframes. MSK pain is common in T2DM patients, particularly in the knee region. There is a notable link between BMI and MSK pain in the past year. Regular assessments and proper treatment guidance for MSK complications are recommended. Additionally, raising awareness about maintaining a healthy weight is key to managing these issues in T2DM patients.

Keywords: *Prevalence of musculoskeletal pain, Type 2 diabetes mellitus, Body mass index, Physical activity level*

Development and validation of a population-specific prediction equation for total body water using deuterium dilution in adult males living in Colombo District

M. F. A. Ahamed, P. Lanerolle, M. de Lanerolle Dias, I. Waidyatilaka

*Department of Biochemistry and Molecular Biology, Faculty of Medicine,
University of Colombo, Sri Lanka*

Accurate assessment of body composition, fat mass (FM), fat free mass (FFM) and total body water (TBW) is vital in the early identification and management of non-communicable diseases (NCDs), which are rising rapidly in South Asia. Conventional indicators such as body mass index (BMI) inadequately reflect health risks in South Asians, who tend to have higher fat percentages at lower BMI cutoffs. Bioelectrical impedance analysis (BIA) offers a non-invasive method to estimate TBW, but its accuracy depends on population-specific equations. A cross-sectional study was conducted among 85 healthy adult males (≥ 18 years) in the Colombo District. TBW was measured using the gold standard deuterium (D_2O) dilution technique. Anthropometric (weight, height, BMI, waist circumference) and BIA derived parameters were collected. Participants were stratified into validation ($n = 57$) and cross validation ($n = 28$) groups. Multiple linear regression was used to derive a TBW prediction equation, which was then validated. Pearson's correlation and Bland Altman analyses were used to evaluate agreement with D_2O derived TBW. A new equation was developed: $TBW\ (kg) = 8.96 + (0.497 \times \text{Weight}) - (0.995 \times \text{BMI}) + (0.197 \times \text{Waist Circumference})$. This showed a strong correlation ($R^2 = 0.7815$) and a small mean bias of -0.05 kg in Bland-Altman analysis. The newly developed anthropometry-based equation is accurate for use in clinical and field settings. The inclusion of weight and waist circumference as the only measured parameters makes it a practical field tool.

Keywords: *Total body water, Deuterium dilution, Body composition, Bioelectrical impedance, Sri Lankan male*

Health-related quality of life and physical activity of the patients with bronchiectasis: A cross-sectional descriptive study at Central Chest Clinic, Colombo and National Hospital for Respiratory Diseases, Welisara

L. R. De Silva¹, C. M. A. Anthony²

¹*Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Family Medicine, Faculty of Medicine, University of Colombo, Sri Lanka*

Bronchiectasis is a chronic respiratory disease characterized by irreversible dilation of the bronchial tubes, frequent infections, and often leads to impaired lung function. These features of bronchiectasis can greatly impact the patients' physical activity (PA) and their health-related quality of life (HRQoL). The aim of this study was to assess the PA levels, HRQoL and association between PA levels and HRQoL in individuals with bronchiectasis. A descriptive cross-sectional study was conducted at the National Hospital for Respiratory Diseases, Welisara, and the Central Chest Clinic, Colombo. A total of 141 clinically stable bronchiectasis patients aged 18-70 years were recruited. Data on sociodemographic factors and bronchiectasis-related data were collected using an interviewer-administered questionnaire. HRQoL was assessed using the EQ-5D-3L questionnaire and Visual Analogue Scale (VAS), while PA levels were measured using the International Physical Activity Questionnaire (IPAQ) – Short Form. The data were analyzed using Statistical Package for the Social Sciences (SPSS), version 22. The mean age of the study population is 48.4 (SD =13.17). The majority were male (56.7%). The EQ-5D-3L questionnaire revealed that mobility issues, difficulty with usual activities and pain/discomfort were more affected. IPAQ showed that 42.6% had low PA while 14.9% had high activity levels. Spearman's correlation analysis demonstrated a significant positive association between PA and both the EQ-5D health score ($r=0.225$, $p=0.007$) and VAS ($r=0.517$, $p<0.01$). Additionally, PA was negatively correlated with mobility ($r = -0.284$, $p = 0.001$), usual activities ($r= -0.276$, $p=0.001$), and pain/discomfort ($r=-0.337$, $p<0.001$), indicating that higher PA levels were associated with better HRQoL outcomes. This study highlights a significant relationship between PA and HRQoL in patients with bronchiectasis. Higher PA levels were associated with better mobility, fewer limitations in usual activities, and lower pain/discomfort. These findings emphasize the importance of incorporating PA interventions into bronchiectasis management to improve patients' overall well-being.

Keywords: *Bronchiectasis, Health-Related Quality of Life, Physical Activity, Mobility, Pain/Discomfort, Usual activity*

Relationship between hip joint active range of motion and spatiotemporal parameters of gait in patients with non-specific low back pain attending the Rheumatology and Rehabilitation Clinic at the National Hospital of Sri Lanka

K. G. N. M. Kariyawasam¹, C. M. A. Anthony²

¹*Department of Allied Health Science, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Family Medicine, Faculty of Medicine, University of Colombo, Sri Lanka*

Low back pain is a global public health concern in musculoskeletal disorders that affects activities of daily living and functional mobility including gait. The range of motion of the hip joint plays a crucial role in gait biomechanics. This study aimed to determine the relationship between hip joint active range of motion and spatiotemporal parameters of gait in patients with non-specific low back pain (NSLBP). This descriptive cross-sectional study was conducted at the Rheumatology and Rehabilitation Clinic at the National Hospital of Sri Lanka. Patients with NSLBP aged between 20-70 years were recruited through simple random sampling technique. Hip joint active range of motion was measured using a long-armed universal goniometer. Kinovea software, 10 m walk test and a hand tally counter were used to assess hip joint range of motion, stride length, walking speed and cadence respectively. The data were analysed using Spearman's Correlation test in Statistical Package for the Social Sciences (SPSS) version 22. Among the 101 study participants 71.3% (n=72) were females. The majority of hip joint active range of motions showed moderate positive correlation with cadence. All hip joint active range of motions showed significant relationships with stride length. Stride length and right hip flexion ($r=0.788$), left hip flexion ($r=0.789$), right hip extension ($r=0.602$), left hip extension ($r=0.616$) had strong positive relationships. There were positive correlations between walking speed and all hip joint active range of motions. Walking speed showed strong positive relationships with right hip flexion ($r=0.973$), left hip flexion ($r=0.972$), right hip extension ($r=0.721$), and left hip extension ($r=0.727$). The study findings show significant relationship between hip joint active range of motion and spatiotemporal parameters of gait. Therefore, clinicians should pay attention to the hip joint and rehabilitation programmes with gait optimisation in the management of NSLBP.

Keywords: *Non-Specific Low Back Pain, Hip Active Range of Motion, Gait parameters, Stride length, Walking speed*

Association of diabetic peripheral neuropathy with lower limb muscle strength and the ankle range of motion of patients who attend diabetic clinics at the National Hospital of Sri Lanka

U. M. Wickramarachchi¹, D. W. N. Dissanayake²

¹*Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Physiology, Faculty of Medicine, University of Colombo, Sri Lanka*

Diabetes mellitus is characterized by chronic hyperglycemia, with diabetic peripheral neuropathy (DPN), the most common type of neuropathy affecting the peripheral nervous system. Most people with diabetes develop diabetic foot, which causes biomechanical changes and muscle alterations. This study assessed the association of DPN with lower limb muscle strength and ankle range of motion (ROM), as well as the correlation between ankle ROM and leg muscle strength in diabetic patients at the National Hospital, Sri Lanka. An analytical cross-sectional study involved 60 participants with DPN and 60 without DPN, using the purposive sampling method. Demographic data were assessed using interviewer-administered questionnaires. A handheld dynamometer and a universal long-armed goniometer were used to measure muscle strength and ankle ROM in both limbs. The Mann-Whitney U test and Spearman correlation tests were employed for data analysis. There was no significant difference in age (DPN: 55.70 ± 4.96 years, without DPN: 54.47 ± 4.56 years, $p=0.08$) or body mass index (DPN: 25.65 ± 3.82 kg m⁻², without DPN: 25.85 ± 4.18 kg m⁻², $p=0.862$) between the two groups. There was no significant difference in dorsiflexor strength (Right; DPN: 4.89 ± 1.15 kg, without DPN: 4.77 ± 0.89 kg, $p=0.753$, Left; DPN: 4.95 ± 1.27 kg, without DPN: 4.85 ± 0.87 kg, $p=0.891$) or plantar flexor strength (Right; DPN: 5.62 ± 0.85 kg, without DPN: 5.90 ± 1.03 kg, $p=0.105$, Left; DPN: 5.76 ± 0.87 kg, without DPN: 5.93 ± 0.97 kg, $p=0.222$) between the two groups. However, a significant difference in plantar flexion ROM was observed in both limbs (Right; DPN: $34.97 \pm 2.86^\circ$, without DPN: $37.67 \pm 1.06^\circ$, $p<0.001$, Left; DPN: $34.90 \pm 2.88^\circ$, without DPN: $37.53 \pm 3.38^\circ$, $p=0.001$) as well as in right dorsiflexion ROM (DPN: 9.63 ± 0.84 , without DPN: 10.23 ± 1.06 , $p=0.001$) except in left dorsiflexion. Dorsiflexor strength and ROM were correlated ($p=0.045$), except for the right side of the DPN group; plantar flexion ROM did not correlate with strength. The DPN was significantly associated with ankle ROM, with enhanced dorsiflexor muscle strength contributing to improved dorsiflexion. This underscores the need for early diagnosis and targeted interventions to optimize both ROM and muscle strength for better ankle function.

Keywords: *Diabetic peripheral neuropathy, Ankle ROM, Muscle strength*

Prevalence and associated factors for heel pain among housewives attending MOH clinics in selected MOH divisions in Colombo District, Sri Lanka

D. M. D. T. Bandara, J. L. R. Jayalath

Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka

Heel pain, a common musculoskeletal foot disorder, encompasses any pain or discomfort in or around the hind foot. Housewives are particularly vulnerable due to the repetitive, regular physical demands of household chores. Hence, this study aimed to assess the prevalence and associated factors of heel pain among housewives attending MOH clinics, in selected MOH divisions of Colombo District, Sri Lanka. This cross-sectional study recruited 113 housewives with no history of trauma, systemic arthritis, heel surgery, skin lesions over the heel or congenital foot abnormalities. Data on demographics and heel pain were collected through an interviewer-administered questionnaire. Ankle dorsiflexion range of motion (ROM), calf muscle endurance, and foot posture were assessed using weight-bearing lunge test, one-legged standing heel raise test, and foot posture index respectively. Data were analyzed using SPSS version 20.0. The mean age and BMI of participants were 45.33 ± 5.87 years and 24.66 ± 3.33 kg/m², respectively. The point prevalence of heel pain was 19.5%, with most reporting severe pain, while the three-month prevalence was 22.1%, with moderate pain being more common. A significant association was observed between heel pain and ankle dorsiflexion ROM, foot posture, and standing duration ($p < 0.001$) while BMI and calf muscle endurance did not show a significant association. In women with heel pain, age showed a negative correlation to ankle dorsiflexion ROM and calf muscle endurance. Heel pain is a significant health issue among housewives affecting nearly 1 in 5. Since associated factors are potentially modifiable, targeted interventions addressing these elements could improve patient outcomes in the management of heel pain.

Keywords: *Heel pain, Prevalence, Housewives, Associated factors*

Knowledge and the prevalence of risk factors of Polycystic Ovarian Syndrome (PCOS) among the students at the university of Sri Jayewardenepura

G. S. H. Perera¹, D. S. Palihakkara¹, V. C. Pathiraja¹, N. Senanayake²

¹*Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Microbiology, Faculty of Medicine, University of Colombo, Sri Lanka*

PCOS, although a common endocrine disorder among females of reproductive age with significant health implications, is poorly understood and often underdiagnosed. Adequate knowledge and access to reliable sources of information are crucial for early diagnosis and reducing long-term complications. A descriptive cross-sectional study was conducted among 148 female undergraduates at the Faculty of Management, University of Sri Jayewardenepura using a self-administered, pretested, and validated questionnaire. Knowledge was categorized into adequate and inadequate using pre-established cutoff values, and the presence of risk factors was also evaluated. The cohort was selected to prevent potential over-estimation of knowledge, and the age at which early manifestations of PCOS typically occur, offering a window of opportunity to intervene. The mean knowledge about PCOS among undergraduates was 7.1216 (SD=5.789) out of 20. The majority (n=108, 72.97%) had a poor knowledge regarding PCOS. Correspondingly, the majority failed to recognize symptoms: hirsutism (56.76%), acne (66.22%), and complications: diabetes (76.35%), infertility (54.73%), or heart disease (83.11%). The majority had acquired knowledge through social media (45.95%, n=68), followed by family members (18.92%, n=28), and only a few via health professionals (11.41%, n=17). The most prevalent risk factors identified were fast food consumption (80.41%), inadequate physical activity (49.32%), obesity (26.35%), family history of DM (39.86%), family history of infertility (39.86%), and irregular menstrual cycles of a 1st degree relative (25.00%). The study findings concluded that despite the high prevalence of risk factors for PCOS, the majority of female undergraduates had inadequate knowledge of the condition compared to age-matched cohorts globally. The predominant source of information was social media, highlighting the critical need for evidence-based, reliable awareness campaigns conducted via online platforms to effectively reach the vulnerable population.

Keywords: *Polycystic Ovarian Syndrome, Knowledge, Risk factors*

High prevalence of the PDE8B rs4704397 (G>A) risk allele in a cohort of normal and overweight/obese Sri Lankan young women

D. Pussella¹, M. S. K. Rabindrakumar¹, U. Branavan²

¹*Department of Life Sciences, Faculty of Science, NSBM Green University, Sri Lanka*

²*Department of Obstetrics & Gynaecology, Faculty of Medicine, University of Colombo, Sri Lanka*

The “A” allele of the phosphodiesterase 8B (PDE8B) rs4704397(G>A) polymorphism is proposed to increase the risk of subclinical hypothyroidism, a known risk factor for infertility and obesity. While only one study has examined the role of A allele in childhood obesity, its association with adult obesity remains unclear. Hence, we aimed to examine the prevalence of PDE8B rs4704397(G>A) polymorphism among normal and overweight/obese Sri Lankan females. A case-control study was conducted at NSBM Green University on 30 healthy young females, including 14 with normal BMI (18.5–22.9 kg/m²) and 16 overweight/obese (BMI ≥23 kg/m²). The rs4704397(G>A) polymorphism was genotyped using PCR-RFLP method. Associations between BMI groups and polymorphisms were analyzed using the chi-square test. The study was approved by the Ethics Review Committee, Faculty of Medicine, University of Colombo (EC-23-140). The mean BMI was 20.9 kg/m² for normal-weight and 26.2 kg/m² for overweight/obese, with a mean age of 23 years (SD=1.931). Among the 14 normal-weights, seven (50%) carried the AA genotype and the 50% carried the AG genotype. None had the GG genotype. In 16 overweight/obese group, all three genotypes were present: AA (n=4;25%), AG (n=9;56%), and GG (n=3;19%). All normal-weight participants carried at least one A (risk) allele, compared to 13 (81%) in overweight/obese. The frequency was higher in the normal-weight (75%) than in the overweight/obese (53%), with an overall allele distribution of 63% A and 37% G. No association was observed between BMI and rs4704397(G>A) polymorphism (p=0.139). The findings indicate that carrying the risk allele may not be directly associated with BMI, possibly due to unmeasured factors such as fat distribution. The presence of the risk allele in normal-weight females suggests a potential future risk for thyroid dysfunction and infertility. This study is a preliminary investigation of the PDE8B gene in Sri Lanka with a small, single-center sample. Larger studies across diverse populations are needed to gain more comprehensive insights.

Keywords: *PDE8B Gene, rs4704397 (G>A), Risk allele, Thyroid dysfunction, Overweight/obese*

Awareness on autism spectrum disorder among primary caregivers of children aged 5 or less, attending child welfare clinics in Battaramulla MOH area

J. F. Ranaa¹, S. S. Ranasingha¹, C. D. Ranasinghe¹, R. H. S. S. Ranasinghe¹,
K. K. Vithanage²

¹*Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Physiology, Faculty of Medicine, University of Colombo, Sri Lanka*

Autism Spectrum Disorder (ASD) is a multifaceted neurodevelopmental condition involving persistent challenges with social communication, restricted interests, and repetitive behaviours. Early diagnosis and intervention are crucial in improving developmental outcomes for children with ASD. In Sri Lanka, awareness of ASD among primary caregivers remains markedly low, hindering timely detection and access to appropriate interventions. This study aims to assess the awareness of ASD among primary caregivers. The specific objectives include evaluating current awareness, identifying sources of child health information, and exploring factors influencing awareness. A descriptive cross-sectional study was conducted among 125 primary caregivers of children aged five or less across five child welfare clinics in the Battaramulla MOH area, utilizing systematic sampling. Data were collected through a pretested, structured interviewer-administered questionnaire. Analysis was done using SPSS version 20. The findings indicated that a majority of caregivers (n=100; 80.0%) possessed limited knowledge regarding ASD with a significant proportion (n=43; 34.4%) having never heard the term “autism”. A significant association was found between educational attainment and relationship to the child, with mothers (n=79; 63.2%) demonstrating greater knowledge than fathers and other caregivers. Social media was the most common source of information. This study highlights a significant lack of ASD awareness and many relying on informal sources. To address this issue, targeted public health campaigns and enhanced healthcare provider education are recommended. Additionally, efforts should engage fathers and other family members in ASD education.

Keywords: *Autism Spectrum Disorder, Primary caregivers, Awareness, Sri Lanka, Child welfare clinics*

Integrating AI to medical education: Readiness, knowledge and expectations of pre-clinical academics of the Faculty of Medicine, University of Colombo

N. Dharmarathne¹, R. Hewapathirana², P. Siribaddana³

¹*Lady Ridgeway Hospital for Children, Colombo, Sri Lanka*

²*Faculty of Medicine, University of Colombo, Sri Lanka*

³*Postgraduate Institute of Medicine, University of Colombo, Sri Lanka*

Artificial intelligence (AI) transforms medical education with personalized, evidence-based, and innovative approaches. The pre-clinical education of MBBS, whilst the most theory-intensive, represents the transition from teacher-led to self-directed learning, where AI integration can smoothen the transition. Successful AI integration in medical education requires not only technical feasibility but also the knowledge and positive mindsets of academics and students. This study aimed to assess the readiness, knowledge, perceptions, and expectations of pre-clinical academic staff on AI tools in medical education at the Faculty of Medicine, University of Colombo (FOM, UOC). A descriptive cross-sectional study was conducted with an online self-administered questionnaire for academic staff members of the Basic Sciences Stream (Anatomy, Biochemistry and Physiology Departments) at FOM, UOC. The questionnaire inquired about the demographics, ICT proficiency, knowledge, perceptions, readiness, and expectations on AI tools in medical education. The response rate was 48.2%, and 57.1% were males. Mean age was 42.9 years, with 50% professors and 43% having ≥ 20 years of experience. ICT proficiency was moderate (mean 3.43/5), with association being significant with male gender ($p=0.045$) but not with age ($p=0.24$). Despite 86% being aware of AI use in medical education, only 28.6% had used AI tools such as ChatGPT and Gemini in teaching. Interest was high (71.4% rated “very interested”), while confidence was moderate (mean 2.64/5) in adopting AI. Improved teaching efficiency (100%) and learning outcomes (85.7%) were the main expectations of adopting AI. They recognized ethical and equity challenges, with 75% saying experts must supervise AI. Over 75% expected AI will revolutionize medical education and requested institutional support, including workshops (100%) and technical assistance (92.8%). Pre-clinical academic staff at FOM, UOC exhibit strong enthusiasm for AI integration but limited hands-on experience and moderate confidence, highlighting the need for targeted training, institutional policies, and technical support to achieve effective implementation.

Keywords: *AI in education, Medical Education, Pre-clinical academics, Readiness for AI, Knowledge and perceptions on AI*

Association between *BRCA1* promoter methylation in peripheral blood DNA and sporadic breast cancer risk in postmenopausal women

K. Krishnasamy, N. N. H. Costha, N. D. Sirisena

*Center for Genetics and Genomics, Department of Anatomy, Genetics and Biomedical Informatics,
Faculty of Medicine, University of Colombo, Sri Lanka*

Breast cancer is a complex disease caused by genetic and epigenetic alterations. While pathogenic variants in the *BRCA1* gene are well-characterized, its promoter methylation leading to epigenetic silencing has also emerged as a potential alternative mechanism affecting gene expression and tumour development. This study aimed to investigate the association between *BRCA1* promoter methylation in peripheral blood DNA and the risk and clinicopathological features of sporadic breast cancer. An existing collection of peripheral blood DNA samples from 30 clinically characterized postmenopausal women with breast cancer and 30 age-matched healthy postmenopausal women was analyzed using methylation-specific polymerase chain reaction (MSP) following DNA bisulfite conversion. Association with clinicopathological features was assessed using descriptive statistics. *BRCA1* promoter methylation was detected in 3.3% (1/30) of breast cancer patients and was absent in healthy controls. There was no statistically significant association between *BRCA1* promoter methylation and breast cancer risk ($p=0.49$). No significant associations were found with age at menarche, parity, BMI, age at first pregnancy, breastfeeding, or contraceptive use. A significant association was observed with age at menopause ($p=0.002$). Tumour characteristics, such as histological type ($p<0.001$), showed a significant association with methylation status. Tumour grade, stage, lymph node involvement, and hormone receptor status [oestrogen receptor (ER), progesterone receptor (PR), human epidermal growth factor 2 (HER2), and triple negative breast cancer (TNBC)] did not show any associations. The only methylated case involved a grade I tumour with mixed histology. Germline *BRCA1* promoter methylation was observed at a low frequency in breast cancer patients and was absent in healthy controls. Its presence in a single early-stage case suggests a potential role in tumour development; however, its low occurrence limits its utility as a predictive biomarker. Larger studies are needed to determine its relevance in risk assessment and prognosis.

Keywords: *DNA methylation, BRCA1, Breast cancer, Promoter region, Methylation Specific PCR*

Association between demographic factors and occupational stress among physiotherapists in government hospitals, Colombo District, Sri Lanka

C. Manamperi¹, P. Herath²

¹*Department of Allied Health Science, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Nursing & Midwifery, Faculty of Allied Health Sciences, General Sir John Kotelawala Defence University, Sri Lanka*

Occupational stress among healthcare professionals is a growing concern, particularly in physiotherapy, where high physical and emotional demands exist. Although international research has examined stress among physiotherapists, limited evidence is available in Sri Lanka, especially within government hospitals. Identifying how demographic factors influence occupational stress can guide targeted stress management interventions and improve professional well-being. A descriptive cross-sectional study was conducted among all physiotherapists working in government hospitals within the Colombo District, Sri Lanka. This included physiotherapists employed at tertiary-care teaching hospitals, base hospitals, and divisional hospitals, with a total of 127 participants. Stress levels were measured using two validated tools, the Occupational Stress Index (OSI) to assess work-related stress factors, and the Perceived Stress Scale (PSS) to capture general perceived stress. Demographic data, including age, gender, and years of experience, were collected via a structured questionnaire. Data were analysed using the Mann-Whitney U test and the Kruskal-Wallis test. Ethical approval was obtained from the Faculty of Medicine, University of Colombo, and informed consent was obtained from all participants. Of the 127 physiotherapists, 83 (65.4%) were female and most (38.6%) were aged 35–44 years. OSI scores showed significant associations with gender ($p=0.001$), age ($p=0.03$), and years of experience ($p=0.004$), with higher stress reported among males, physiotherapists aged 55 years or older, and those with more than 10 years of service. In contrast, PSS scores showed no significant association with gender or age. These findings suggest that occupational stress captures workplace-specific stressors not fully reflected by the PSS. Demographic characteristics, including gender, age, and years of experience, are significantly associated with occupational stress among physiotherapists in government hospitals. The dual use of OSI and PSS provided complementary insights, distinguishing between occupational and general stress. Targeted, demographic-specific interventions are recommended to support the psychological well-being and professional sustainability of physiotherapists in Sri Lanka.

Keywords: *Occupational stress, Physiotherapists, Demographics, Government hospitals, Colombo District*

Prevalence, associated factors, and treatment-seeking behaviour related to musculoskeletal (MSK) pain among university-level cricketers in selected state universities in Western Province

M. Dilakshan¹, D. Samaranayake²

¹*Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Community Medicine, Faculty of Medicine, University of Colombo, Sri Lanka*

Cricket requires high levels of agility, coordination, and endurance making cricketers prone to musculoskeletal (MSK) pain due to repetitive movements, overuse, and intense training schedules. Limited evidence exists regarding MSK pain in Sri Lankan university cricketers. The aim of this study was to determine the prevalence, associated factors, and treatment-seeking behavior related to MSK pain among university-level cricketers in selected state universities in Western Province. A descriptive cross-sectional study was conducted among 89 male cricketers who were active for at least six months in university cricket teams in five state universities. Data were collected using an interviewer-administered questionnaire incorporating socio-demographic details, training history, Nordic Musculoskeletal Questionnaire and treatment-seeking behaviour. Data were analysed using SPSS-22.0 with descriptive statistics and Fisher's exact test to assess associations. Eighty-nine male participants were included, with a mean age of 23 years (SD = 1.37) and a mean BMI of 22.2 kg/m² (SD = 3.39). Participants reported an average training duration of 3.67 hours per session (SD = 0.79). A high prevalence (94.4%, n=84) of MSK pain was reported within the past 12 months. The most commonly affected region was lower back (39.3%, n=35), followed by shoulder (33.7%, n=30) and hip/thigh (21.3%, n=19). Statistically significant associations were found between higher training hours per session and MSK pain (p=0.042), and between high BMI and neck pain (p=0.042), while no association was found between role played in cricket and overall MSK pain. Treatment was sought by 66.3% of affected, predominantly from physiotherapists, with 58.4% reporting improvement. MSK pain is highly prevalent among university-level cricketers in Western Province. Prolonged training sessions appear to be contributing factors. Despite a majority seeking treatment, there remains a need for injury prevention strategies and better training load management for university-level cricketers in Western Province.

Keywords: *Musculoskeletal pain, Cricketers, Training load, Treatment-seeking*

Relationship between handgrip strength and fear of falls among older adults in selected elderly homes in Kalutara District, Sri Lanka

A. I. M. Waidyarathne¹, S. S. Y. Withanage²

¹*Department of Allied Health Science, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Medical Microbiology and Immunology, Faculty of Medicine, University of Colombo, Sri Lanka*

Rapid population aging poses a challenge to health and long-term care. Handgrip strength (HGS) is a useful method for evaluating the general muscle strength of elderly individuals. Fear of falls (FOF) is another component that increases the risk of falls by impairing balance and causing an unsuitable stride. FOF is particularly significant because it deconditions the person, increasing the risk of falls in the future, and it affects mental health by causing depression and anxiety. This study aimed to determine the relationship between handgrip strength and fear of falling among older adults residing in elderly care homes. This relationship is particularly important in geriatric assessment, as both connected characteristics affect functional independence mobility, and fall prevention. A cross-sectional study involved 126 older adults aged 60 and above in selected elderly homes in Kalutara District, Sri Lanka, using the convenient sampling method. HGS was measured using a Jamar dynamometer, while fear of falls was assessed using the Falls Efficacy Scale-International (FES-I). The Spearman's correlation test and the Mann-Whitney U test were used for data analysis in SPSS v23. The study population consisted of 38 males (30.15%) and 88 females (69.85%), with a mean age of 72 years (± 7.98). Regarding the Falls Efficacy Scale-International, 67.5% of participants were classified as having a high fear of falls, 7.9% as having moderate, while 24.6% of participants fell under the low fear of falls. There was a significant difference in handgrip strength among males and females ($p < 0.01$). Males have higher grip strength than females. There was no significant difference between Fear of falls and gender ($p = 0.461$). The study found a significant negative correlation between handgrip strength and fear of falls ($r = -0.380$, $p < 0.01$). According to the findings, strength-enhancing activities in routine care may not only improve physical function but also reduce fear of falls. Emphasizing the critical role of assessing and addressing muscle strength in interventions targeting fall risk and psychological well-being among older adults, highlighting the potential advantages of incorporating strength assessments and targeted physical exercises into fall prevention strategies for those living in institutional settings.

Keywords: *Sri Lankan older adult, Fear of Fall, Handgrip strength*

Prevalence and contributing factors of musculoskeletal discomfort among operation theatre nurses in the National Hospital, Sri Lanka

B. K. S. Nisansala¹, P. W. P. Chathurangana²

¹*Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Pediatrics, Faculty of Medicine, University of Colombo, Sri Lanka*

Musculoskeletal discomfort is highly prevalent among nurses, especially those working in the operating theatres, who are exposed to prolonged standing, awkward static postures, repetitive tasks, handling patients and equipment, all of which contribute to the development of musculoskeletal discomfort. This study aimed to assess the prevalence of musculoskeletal discomfort and identify key occupational and demographic factors among theatre nurses at the National Hospital of Sri Lanka. A cross-sectional descriptive study was conducted among 153 theatre nurses using the standardized Nordic musculoskeletal questionnaire and a structured demographic questionnaire. Descriptive statistics were used to calculate the prevalence, and contributing factors were examined using the chi-square test and the Mann-Whitney test. The sample consisted of 140 females (91.5%) and 13 males (8.5%). The majority of the theatre nurses (43.15%) were aged between 21 and 30 years. The prevalence of MSD was considerably high, with 80.4% of participants reporting discomfort in two or more joints. The most affected areas were the lower back (64.1%), the ankles (56.9%), the knees (52.3%), and the right shoulder (41.8%). Significant associations were found between continuous working hours and ankle ($p=0.029$) and knee discomfort ($p=0.0000$). Age was significantly associated with the right shoulder ($p=0.006$). The study revealed a high prevalence of musculoskeletal discomfort among theatre nurses. Prolonged working hours and age were identified as key contributing factors. These findings highlight the urgent need for ergonomics interventions and schedule adjustments to reduce musculoskeletal discomfort risk in the theatre nurses and workforce.

Keywords: *Musculoskeletal discomfort, Theatre nurses, Prevalence, Contributing factors*

The role of a selected group of healthcare providers as a source of health information: A primary study

A. R. R. Ramzath¹, Y. D. Siriwardana²

¹*Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Parasitology, Faculty of Medicine, University of Colombo, Sri Lanka*

Healthcare providers (HCPs) are widely regarded as the most reliable source of health information, yet their role in Sri Lanka has remained underexplored. This study aimed to describe the types of health-related support requested, the nature of support provided, and HCPs' perceptions of their information-giving role. Associations between variables were also assessed. A descriptive cross-sectional study was conducted among 167 HCPs working at two Base Hospitals. A self-administered questionnaire captured socio-demographic and occupational data, patterns of health information requests, support provided, and self-perceptions. Descriptive statistics summarised the data, and the chi-square tests assessed the relationship between variables. Most were females (67.7%), and nursing officers (68.3%) with ≤24 years of service (83.8%). The majority (86.8%, n = 46/53) had a specialisation related to the healthcare field. Immediate family of the HCP (82.6%), patients (82.0%) and colleagues (76.0–80.8%) were the commonest information seekers, typically contacting HCPs at least weekly (59.9%) via face-to-face encounters (92.2%) or phone calls (83.2%). Frequently requested topics were information about disease management (82.6%), diet (74.3%) and hygiene (73.7%). HCPs rated their knowledge-sharing role highly; 92% perceived their knowledge level as high, and most scored their supportiveness between 80%-100%. Longer service duration was positively associated with supportiveness but inversely related to training programme attendance, while qualification level showed weak associations with dissemination competence. The study emphasises the crucial role of HCPs in disseminating health information and the need for continuous professional development to enhance their effectiveness.

Keywords: *Healthcare Providers (HCPs), Health information seeking, Sources of health information, Knowledge dissemination, Perception*

Impact of knee osteoarthritis complications on quality of life in older adults attending the National Hospital of Sri Lanka

N. T. K. Arachchige, A. H. Wettasinghe

Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka

Knee osteoarthritis (KOA) is a progressive degenerative joint disorder characterized by pain, stiffness, and swelling, which can greatly reduce quality of life (QoL). Knee osteoarthritis often leads to reduced physical performance, increased pain perception, kinesiophobia, and impaired proprioception. This study evaluates the impact of these KOA complications on QoL in older adults. A cross-sectional study was conducted at the National Hospital of Sri Lanka between August and September 2024, involving older adults aged 65 years and above with grade 3 KOA. The QoL was assessed using the 36-Item Short Form Survey (SF-36), while physical performance was tested with the Timed Up and Go (TUG) test. Proprioception and kinesiophobia were evaluated through the lower limb position sense test and Tampa Scale for Kinesiophobia (TSK), respectively. Pain was assessed using the visual analogue scale (VAS). Spearman's rank correlation was used for statistical analysis via SPSS version 23. The study involved 246 older adults diagnosed with KOA, including 207 females (84.1%) and 39 males (15.9%), with a mean age of 69.3 ± 3.8 years. A moderate negative correlation was found between TUG scores, TSK scores, and the Physical Component Summary (PCS) of the SF-36 ($p < 0.001$). Furthermore, a weak but significant negative correlation was found between the Mental Component Summary (MCS) and both TUG ($p < 0.001$) and TSK ($p = 0.009$) scores. Pain severity showed a weak significant negative correlation with PCS ($p < 0.001$), while proprioception showed no significant association with either component of QoL. Physical performance and kinesiophobia are moderately associated with poorer physical QoL and weakly linked to mental well-being in older adults with KOA. Pain severity also negatively impacts physical QoL, whereas proprioception shows no significant impact. These results highlight the importance of addressing mobility limitations, kinesiophobia, and pain management in improving the quality of life in this population.

Keywords: *Knee osteoarthritis, Quality of life, Physical performance Kinesiophobia, Painproprioception*

Parents'/guardians' knowledge and attitudes regarding physiotherapy in the rehabilitation of children with Cerebral Palsy (CP) and their caregiver burden: A cross-sectional descriptive study at the Lady Ridgeway Hospital, Colombo

R. S. Weerathunga¹, C. Liyanage²

¹*Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Pharmacology, Faculty of Medicine, University of Colombo, Sri Lanka*

Cerebral Palsy (CP) is one of the most common childhood disabilities, characterized by motor disorders resulting from damage to the developing brain of a foetus or infant. This study assessed parents'/guardians' knowledge, attitudes, and caregiver burden regarding physiotherapy in CP rehabilitation and associated factors with those attending the Physiotherapy Department (PD), Lady Ridgeway Hospital (LRH), Colombo. This descriptive cross-sectional study was conducted among parents/guardians (grandparents/uncles/aunts/siblings) of children with CP attending the PD, recruited by convenience sampling. To minimize potential selection bias, consecutive recruitment was carried out across all clinic sessions with consistent inclusion criteria, and questionnaires were available in English, Sinhala, and Tamil to ensure inclusivity. The sample size was calculated using the equation for observational studies for continuous variables. Two self-administered questionnaires, developed to assess the level of knowledge and attitudes, were pilot-tested and translated from English into Sinhala and Tamil. The Caregiver Difficulties Scale (CDS), validated in Sri Lanka, is available in both English and Sinhala. It is being used with permission from the authors, and the Tamil translation was pilot tested. The levels of knowledge and attitude were categorized according to scoring systems from previous studies. Descriptive statistics, chi-square test, one-way ANOVA, and independent sample t-test were used for analysis. 62 participants, 55 females (88.7%), with an average age of 39.16 (± 7.99), were recruited. The mean CDS score was 45.56 (± 9.48), indicating a moderate caregiver burden. The majority (69.3%, n=43) had a higher level of knowledge, while 62.9% (n=39) had an average level. While most caregivers had high knowledge regarding physiotherapy in CP rehabilitation, their attitudes remained average. These findings underscore the need for structured caregiver education, counseling, and psychosocial support within rehabilitation services to further enhance positive attitudes and alleviate caregiver burden. Strengthening multidisciplinary approaches at LRH could improve both caregiver well-being and the continuity of effective rehabilitation for children with CP.

Keywords: *Cerebral Palsy, Knowledge, Attitudes, Caregiver burden, Associated factors*

A study on the pattern of injuries admitted to the accident and emergency service, National Hospital of Sri Lanka

G. Panchadcharam, J. Arudchelvam

*Department of Vascular and Transplant Surgery, Faculty of Medicine,
University of Colombo, Sri Lanka*

Traumatic injuries are a leading cause of hospitalization and mortality in Sri Lanka. National Hospital of Sri Lanka (NHSL) receives trauma patients from the entire country. Road Traffic Accidents (RTA) are a primary cause of trauma. This study reports the pattern of injuries admitted to the NHSL. This is a descriptive cross-sectional study. The patients admitted to the NHSL with fractures, neurotrauma, vascular injury, abdominal and other injuries were included. Data on date and time of admission, demography, place / site of incident, date / time of incident, mechanism of injury, type of vehicle involved (if RTA) and type of injuries were collected. Incomplete data were excluded. A total number of 160 were included of which 140 (87.5%) were males and 20 (12.5%) were females. Mean age of the patients was 39.6 (08-88) years. Causes of injury were; RTA 73 (45.6%), accidental slip and fall 26 (16.2%), fall from height 13 (8.1%), assault 10 (6%), self-inflicted injuries 9 (5.6%), occupational injuries 6 (3.7%) and sports injuries. The type of vehicle involved in RTA was motor bike in 47 (64.3%), three-wheeler in 9 (12.3%), bicycles in 3 (4.1%), bus in 3% and others 11 (15%). Among the patients, 81 (41%) had fractures, 36 (16.5%) neurotrauma, 32 (15%) vascular injuries, and 27 (12.4%) thoraco-abdominal injuries. 136 (83.7%) underwent interventions and 26 (16.3%) were managed non-operatively. This study shows that early middle aged (39.6 years) males are the highest number of trauma admission to the NHSL. Motor bikes are the predominant vehicle involved with RTA (64.3%) associated injuries. This indicated that a strict policy on motor bike traffic control should be implemented.

Keywords: *Pattern of injuries, Trauma, Road Traffic Accident, National Hospital of Sri Lanka (NHSL)*

A single-surgeon experience of cadaveric organ retrieval: A retrospective review

J. Arudchelvam, P. H. R. S. Mendis, D. S. Palihakkara

*Vascular and Transplant Unit, Department of Surgery, Faculty of Medicine, University of Colombo/
National Hospital of Sri Lanka, Colombo, Sri Lanka*

Cadaveric organ transplantation in Sri Lanka is a growing field that depends on timely coordination between retrieval hospitals and transplant centers. Understanding the patterns of organ retrieval is critical to optimizing this process. This study presents a single surgeon's experience on cadaveric organ retrieval from a range of hospitals across the country. This is a retrospective review of cadaveric organ retrievals received by a single transplant surgeon. Data on donor age, gender, date of retrieval, referring hospital, and inter-hospital transfer distance were analyzed. A total of 56 organ retrievals were recorded. Of these, 75% of the donors were male, and the mean donor age was 37.54 years (range: 3.5–65 years). Organs were retrieved from 14 different hospitals, with the highest contribution from Colombo (27.5%). The inter-hospital transfer distance ranged from 0 km (within hospital) to 259 km. (Trincomalee-Colombo). The distance from the retrieval hospital to the transplant center was analyzed across different time periods. During the early period (2010–2012), the mean distance was 4.75 km, as organs were primarily accepted from nearby hospitals due to logistical constraints. In the intermediate period (2017–2019), the mean distance increased to 142.84 km, reflecting the establishment of organized retrieval teams and improved manpower. Between 2022 and 2024, the mean distance decreased to 53.11 km, attributed to a growing perception that organs—particularly livers—retrieved from distant locations were more likely to suffer functional impairment. There has been a recent shift toward limiting the acceptance of organs transported over long distances, in an effort to minimize ischemic injury and reduce the risk of graft dysfunction. Given the growing number of recipients on the transplant waiting lists, the establishment of efficient transport systems, as well as necessary steps to increase the number of retrievals, is important.

Keywords: *Cadaveric, Transplant, Organ, Retrieval, Logistics*

Assessing the relationship between body mass index, dynamic balance, and pain intensity in patients with chronic low back pain attending selected hospitals in the Colombo District

M. Umama, A. Wettasinghe

Department of Allied Health Science, Faculty of Medicine, University of Colombo, Sri Lanka

Chronic low back pain (CLBP), a prevalent musculoskeletal condition, is influenced by factors such as body mass index (BMI), dynamic balance, and pain intensity. These factors can significantly affect physical function and quality of life. This study aimed to assess the relationship between BMI, dynamic balance, and pain intensity among CLBP patients attending physiotherapy clinics in selected hospitals in the Colombo District. A descriptive cross-sectional study was conducted among 123 patients with CLBP aged 18–65 years at the Physiotherapy Units of National Hospital of Sri Lanka and Colombo South Teaching Hospital. Demographic data, pain intensity, dynamic balance, leg length, and anthropometric measurements were assessed using an interviewer-administered questionnaire, the Numeric Rating Scale (NRS-11), the Star Excursion Balance Test (SEBT), a measuring tape, a stadiometer, and a weighing scale, respectively. Statistical analysis was performed using SPSS version 25.0. Among the 123 participants, 78.05% were female, with a median age of 49 years (IQR = 22). More than half (58.71%) had a BMI above the normal range (median = 26.20, IQR = 5.70). Moderate pain (median score = 5.00, IQR = 3.00) was reported by 57.72% of participants. Mean SEBT scores were 62.44 ± 6.95 (left) and 61.15 ± 7.70 (right). BMI showed a weak positive correlation with pain intensity ($r = 0.35$, $p < 0.001$) and a very weak negative correlation with the left SEBT score ($r = -0.197$, $p = 0.029$), but not with the right SEBT score ($r = -0.135$, $p = 0.136$). A higher BMI was associated with increased pain intensity and reduced dynamic balance on the left side. These findings suggest that weight management and balance training may be important components in managing CLBP.

Keywords: *Chronic low back pain, Body mass index, Dynamic balance, Star Excursion Balance Test*

Comparison of upper limb muscle strength, lower limb muscle strength and quality of life of older adults who practice yoga and do not practice yoga in selected settings in Colombo District

A. M. D. Lakmali, C. Ranasinghe

Department of Allied Health Science, Faculty of Medicine, University of Colombo, Sri Lanka

Yoga is an ancient practice that enhances strength, balance, flexibility, and mental health worldwide. This study aims to compare the impact of regular yoga practice on muscle strength and quality of life, between yoga practitioners and non-yoga practitioners aged 65 years or older in Sri Lanka. A cross-sectional study was conducted at Sethsanda Yoga Academy in Maharagama and 330 National Housing Scheme, Colombo 8, Sri Lanka, involving yoga practitioners and non-yoga practitioners aged ≥ 65 years. Upper limb and lower limb muscle strength were evaluated using a hand-held dynamometer and the 30-second chair stand test, respectively. Quality of life (QoL) was assessed using the SF-36 Questionnaire, which covers physical, emotional, and social dimensions. The Mann-Whitney U test was used to determine significant differences between the two groups using SPSS version 22. Fifty yoga practitioners (male; $n=11$, female; $n=39$), with a mean $\pm$ SD age of 67.5 ± 2.7 years and fifty non-yoga practitioners (male; $n=11$, female; $n=39$) with a mean $\pm$ SD age of 67.4 ± 3.3 years participated in the study. A statistically significant difference was observed in upper limb and lower limb muscle strength between yoga practitioners and non-yoga practitioners with $p=0.000$ ($p < 0.05$). In the 30 second chair stand test, yoga practitioners (14.2 ± 2.8) showed higher value than non-yoga practitioners (9.68 ± 1.8). Quality of life (SF- 36) showed higher scores in yoga practitioners across various domains with $p=0.000$ ($p < 0.05$). Yoga practitioners showed enhanced muscle strength and higher quality of life scores compared to non-yoga practitioners. These findings suggest that regular yoga practice positively impacts and improves physical and emotional well-being.

Keywords: *Yoga, Upper limb muscle strength, Lower limb muscle strength, Quality of Life, 30 second chair stand test*

Role of rPagSP02 and rPagSP06 salivary biomarkers of *Phlebotomus argentipes* in measuring vector exposure in Sri Lanka

S. B. Piyasiri¹, S. A. S. C. Senanayake¹, T. N. Samaranayake¹, S. Doh², E. Iniguez²,
J. G. Valenzuela², S. Kamhawi², N. D. Karunaweera¹

¹Department of Parasitology, Faculty of Medicine, University of Colombo, Sri Lanka

²Vector Molecular Biology Section, Laboratory of Malaria and Vector Research, NIAID,
National Institutes of Health, Maryland, 20892, USA

Phlebotomus argentipes is the incriminated vector of the transmission of *Leishmania donovani* across the Indian subcontinent. In Sri Lanka, this vector is predominantly linked to cutaneous leishmaniasis (CL). Host antibody responses to sand fly salivary proteins serve as valuable markers for determining human exposure to sand fly bites in endemic regions. This study aimed to evaluate and compare the immunological performance of two salivary antigens for assessing exposure to *P. argentipes* bites in a CL-endemic setting in Sri Lanka: a native salivary gland homogenate (SGH) derived from locally reared female *P. argentipes*, and a recombinant composite antigen comprising rPagSP02 and rPagSP06 proteins. Venous blood samples (3 mL) were obtained from 546 healthy individuals in a CL-endemic area, 30 confirmed CL patients, and 15 residents from non-endemic areas. Serum was separated and analyzed using optimized indirect ELISA protocols to detect anti-*P. argentipes* IgG antibodies. Both SGH and the recombinant antigen demonstrated high diagnostic accuracy. The recombinant rPagSP02 + rPagSP06 antigen showed excellent sensitivity (96.7%) and perfect specificity (100%). Comparable seropositivity rates were observed between the two antigen formats among residents in endemic areas, supporting the validity of the recombinant marker in detecting natural exposure. The recombinant antigen was more effective in distinguishing individuals with and without exposure to *P. argentipes* bites. A strong positive correlation ($r = 0.869$) was observed between optical density values from assays using SGH and those using the recombinant antigen. In conclusion, the rPagSP02 + rPagSP06 recombinant antigen is a promising, reproducible, and standardized biomarker for monitoring human exposure to *P. argentipes* in Sri Lanka. Its high diagnostic performance and scalability highlight its potential for inclusion in surveillance and vector control evaluation programmes. Further research is recommended to explore its applicability in other leishmaniasis-endemic regions.

Keywords: *Phlebotomus argentipes*, Salivary biomarkers, Vector exposure, Cutaneous leishmaniasis, *Leishmania donovani*

Relationship between physical performance and quadriceps muscle strength of the patients with knee osteoarthritis attending the Rheumatology and Rehabilitation clinics in the National Hospital of Sri Lanka

K. M. U. I. Bandara¹, I. Atukorala²

¹*Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Clinical Medicine, Faculty of Medicine, University of Colombo, Sri Lanka*

Knee osteoarthritis (KOA) is a major cause of pain and disability worldwide. Quadriceps weakness has been identified as an important contributor to functional limitations. Physical performance (i.e. the ability to carry out functional activities such as mobility, balance, and strength-based tasks.), is a key outcome in KOA, as reduced performance limits independence and quality of life. While this association is well established globally, evidence from South Asian populations is limited. Sociocultural and demographic factors may influence outcomes differently in local settings. This study aimed to investigate the relationship between quadriceps muscle strength and physical performance in KOA patients attending the National Hospital of Sri Lanka in order to provide region-specific evidence to guide rehabilitation strategies. An analytical cross-sectional study was conducted among patients with clinically diagnosed KOA, aged >50 years, attending the Rheumatology clinics at the National Hospital of Sri Lanka. Demographic data were collected using an interviewer-administered questionnaire. Quadriceps muscle strength was measured using a hand-held dynamometer, while physical performance was assessed with the Timed Up and Go (TUG) test, a validated measure of functional mobility. Data were analyzed using SPSS v22. Spearman correlation and Mann–Whitney U tests were applied to determine associations. The study included 112 participants (mean age 58.57 ± 6.59 years; 91.1% female). Most participants (89.3%) presented with bilateral KOA. The mean quadriceps muscle strength was 38.38 N (± 10.41), while the mean physical performance measured by the TUG test was 13.3s (± 2.75) seconds. Correlation analysis showed a negative correlation between quadriceps strength and TUG time ($r = -0.53$, $p < 0.001$), indicating that lower quadriceps strength was associated with poorer physical performance. Age demonstrated a positive correlation with TUG time ($r = 0.505$, $p < 0.001$), suggesting that older participants performed worse on the mobility test. In addition, quadriceps strength was significantly lower in females compared to males ($p = 0.026$), though no significant gender differences were observed in TUG performance ($p = 0.155$). This study confirms the association between quadriceps strength and physical performance in KOA patients in a Sri Lankan population, consistent with international findings. However, the predominance of female participants and the relatively younger mean age compared to global cohorts suggest unique contextual factors. These findings emphasize the need for targeted quadriceps strengthening in local rehabilitation programmes to enhance mobility and quality of life in KOA patients.

Keywords: *Knee osteoarthritis, Physical performance, Quadriceps muscle strength*

Comparative evaluation of antioxidant activity in flower and leaf extracts of *Tagetes lemmonii* assessed by DPPH radical scavenging method

W. A. J. Perera, S. S. S. De Silva, S. M. T. Jayasena, M. D. M. Fernando

Center for Natural Products Research and Biotechnology for Integrative Health, Department of Biochemistry & Molecular Biology, Faculty of Medicine, University of Colombo, Sri Lanka

Tagetes lemmonii, commonly known as Lemmon's Marigold, is a perennial herbaceous plant native to Mexico and the southwestern United States. This plant can also be cultivated and is found in certain regions of Asia. Although it has garnered attention for its potential medicinal properties, its antioxidant activity remains relatively underexplored in scientific literature. Given the increasing demand for natural antioxidants in therapeutic and nutraceutical formulations, this study aimed to evaluate and compare the antioxidant activity of methanol:water (4:1) extracts obtained from the flowers and leaves of *T. lemmonii* using the DPPH radical scavenging assay. Flower and leaf extracts were prepared by macerating 5 g of air-dried flowers and 14.09 g of dried leaves for 72 hours in the methanol:water (4:1) solvent system, with identical material-to-solvent ratios. Extracts were filtered and concentrated by rotary evaporation. The effective concentrations of the samples required to scavenge the DPPH free radicals by 50% (EC₅₀) were obtained by linear regression analysis of the dose response curves. All experiments were performed in triplicate. Both flower and leaf extracts of *T. lemmonii* exhibited antioxidant activity, with the leaf extract (EC₅₀: 48.9 ± 9.4 µg/mL) being more potent than the flower extract (EC₅₀: 64.11 ± 5.66 µg/mL), though both were less potent than ascorbic acid (9.02 ± 1.17 and 32.63 ± 0.87 µg/mL, respectively), highlighting *T. lemmonii* as a promising source of natural antioxidants, with the leaf extract showing higher potency than the flower extract. The study did not determine the phytochemical composition of the extracts, limiting attribution of activity to specific compounds. Literature suggests that other *Tagetes* species exhibit antioxidant activity in both leaves and flowers, supporting the potential of *T. lemmonii* as a natural antioxidant source. Future work incorporating phytochemical profiling would clarify the compounds responsible for the observed activity.

Keywords: *Tagetes lemmonii*, Antioxidant activity, DPPH assay, Methanol extract

Stability of polyphenols and vitamin C in selected Sri Lankan fruits and leafy vegetables under varying processing and storage conditions

A. Ananthakumaran¹, A. Hariharan¹, R. Ahamed¹, M. D. M. Fernando²

¹*Faculty of Life and Medical Sciences, Business Management School (BMS), Sri Lanka*

²*Center for Natural Product Research and Biotechnology for Integrative Health, Department of Molecular Biology and Biochemistry, Faculty of Medicine, University of Colombo, Sri Lanka*

Polyphenols and vitamin C are natural antioxidants in fruits and vegetables, which act synergistically to neutralize free radicals and promote wellbeing. Their stability is highly influenced by processing, cooking, additives, and storage. Although Sri Lanka is rich in antioxidant-containing produce, little research has explored how these factors influence phytochemical stability. This study evaluates the stability of polyphenols and vitamin C in Sri Lankan fruits: Passion fruit (*Passiflora edulis*), Heen Naran (*Citrus crenatifolia*), Kiwi (*Actinida deliciosa*), and Papaya (*Carica papaya*)—and leafy vegetables: Gotukola (*Centella asiatica*), Moringa (*Moringa oleifera*), and Coriander (*Coriandrum sativum*). For Total Phenolic Content (TPC) analysis, three leafy vegetables were subjected to three cooking methods (boiling, steaming, stir-frying), oven-dried, powdered, and extracted using Ultrasound-Assisted Extraction (UAE) with methanol to obtain crude extracts. Three fruits were crushed, extracted via UAE with distilled water, and freeze-dried to obtain powders. The extracts were analyzed for TPC using the Folin–Ciocalteu method, with results expressed as mg Gallic Acid Equivalents (GAE) per gram of extract. Vitamin C stability was determined in diluted fresh fruit juices stored under different conditions, using iodometric titration. All experiments were conducted in triplicate. The findings revealed that sugar addition improved vitamin C retention, while refrigeration at 4°C significantly reduced degradation. Steaming was the most effective cooking method for preserving phenolic compounds, whereas boiling and stir-frying generally reduced TPC, except in coriander where boiling yielded notably high values (71.562±3.626 mg GAE/g), as boiling breaks down cell wall components, releasing bound phenolics and increasing their extractability. Furthermore, fruit peels contained higher phenolic levels than pulps, particularly in Heen Naran (3.14± 0.4 mg GAE/g). Vitamin C stability is higher in colder temperatures (Kiwi: 35% loss at room temperature vs. 23% under refrigeration). Overall, the study demonstrates that processing, cooking, and storage strongly impact antioxidant stability, highlighting minimal processing, cooler storage, and steaming as optimal strategies to preserve nutritional and therapeutic benefits.

Keywords: *Total Phenolic Content, Vitamin C stability, Green leafy vegetables, Fresh fruits, Methanolic extract*

Adherence to the physiotherapy among patients with chronic respiratory diseases at Central Chest Clinic, Borella, Sri Lanka

A. M. M. H. De Silva, K. R. M. Chandrathilaka

Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka

Chronic respiratory diseases (CRDs) are long-lasting lung conditions caused by various harmful exposures, with symptoms often lasting more than 18 months and affecting people globally. Physiotherapy is crucial in managing CRDs, and patient adherence to physiotherapy is variable depending on various factors. This study was conducted to identify the prevalence of patients' adherence to physiotherapy and to describe the associated sociodemographic factors of patients with CRDs. A descriptive cross-sectional study was conducted at the outpatient physiotherapy clinic of the Central Chest Clinic (CCC), Borella, Sri Lanka. Patients with CRDs aged 18 - 65 years and who were referred to the physiotherapy clinic were recruited. An interview-administered questionnaire was used to gather data, while gender, place of residence, marital status, educational status, mode of transport, and age were considered as sociodemographic characteristics. The data were analyzed through the chi-square test and Mann-Whitney U test using the Statistical Package for Social Sciences (SPSS) version 25.0. Participants who performed the physiotherapy interventions at home continuously for the past six months were considered adherent, those who did not were considered non adherent. Among 159 participants with CRDs, 79% (n=125) adhered to interventions. A significant association was found between place of residence and physiotherapy adherence ($p=0.006$). The majority of those who adhered to interventions lived in permanent residences (93.6%) compared to non-adherents (79.4%). Other sociodemographic factors, including gender, marital status, educational status, mode of transport, and age, did not show any statistical significance ($p>0.05$) with physiotherapy adherence. Nearly equal representation of males (48.8%) and females (51.2%) adhered to physiotherapy. The majority of participants in both groups were married, with 88.8% in the adhered group and 88.2% in the non-adhered group. However, educational status varied notably between the two groups. The majority of the participants who adhered to physiotherapy used buses (n=78.4%) for transportation, whereas non-adhering patients relied on a more varied range of transportation options. The majority of the patients with CRDs attending physiotherapy adhere to prescribed interventions. Residential stability may play an important role in enabling consistent adherence to physiotherapy interventions.

Keywords: *Chronic respiratory diseases, Adherence, Physiotherapy, Sociodemographic factors*

The relationship between the body mass index and physical activity level among Law Faculty students at the University of Colombo

V. M. Amaraweera¹, S. Weerasinghe²

¹*Department of Allied Health Science, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Sports Science, Faculty of Applied Sciences,
University of Sri Jayewardenepura, Sri Lanka*

Body mass index (BMI) is widely recognized as an important indicator of overall health, particularly among university students. It may be influenced by lifestyle factors such as physical activity level and dietary habits. This study aimed to assess the relationship between BMI and physical activity level among Law Faculty students at the University of Colombo. A descriptive cross-sectional study was conducted at the Faculty of Law, University of Colombo, using a sample of 257 undergraduate students aged 20-26 years. Weight and height measurements were taken using standard measuring tools to determine their BMI. BMI was divided into four categories according to the Asia-Pacific guidelines: underweight, normal weight, overweight, and obese. Physical activity level of the participants was assessed using the International Physical Activity Questionnaire-Short Form (IPAQ-SF). Descriptive statistics and the chi-square test were used for data analysis using SPSS version 22. The sample comprised 57 (22.2%) males and 200 (77.8%) females, with a mean age of 22.79 (± 1.55) years. Most participants were in the normal weight BMI category (61.4%), and the least number of students were categorized as obese (1.2%). The majority of participants (60.3%) reported a moderate level of physical activity, whereas only 18.2% reported high physical activity levels. A significant relationship was found between the BMI category and physical activity level ($p=0.001$) among Law Faculty students at the University of Colombo. Results revealed that the majority of the Law Faculty students who participated in this study maintain healthy body weights and moderate physical activity levels. The results confirm that physical activity level was associated with BMI among Law Faculty students at the University of Colombo, indicating that students who are more physically active tend to maintain healthier body weights. Therefore, strategies for enhancing physical activity levels should be advocated for maintaining a healthy BMI.

Keywords: *Body mass index, Physical activity level, University students, Law*

An intricate connection between the mind and body: A case study of a 12-year-old girl with behavioural changes for 1 ½ years presenting with catatonic symptoms from Dehiwala

S. C. Wickramaratne¹, A. Herath², P. Rathnayake¹, S. Wijesinghe¹

¹*Lady Ridgway Hospital for Children, Sri Lanka*

²*Department of Psychiatry, Faculty of Medicine, University of Colombo, Sri Lanka*

This case study focuses on a 12-year-old girl from Dehiwala, Sri Lanka who presented with behavioural changes for 1 ½ years and who became mute for 3 days prior to hospital admission. The development of a few other catatonic symptoms was more in favour of an organic aetiology. Even though the supportive evidence by investigations was not conclusive for an organic aetiology the child's symptoms started to respond for IV immunoglobulin. However, the remaining negative psychotic symptoms slowly started responding to Amisulpiride. An additional challenge on managing this child was her sensitivity to antipsychotics which left only a minute array of medications for her symptom relief. This case study included a thorough assessment of clinical evaluation including history taking, physical and mental state examination findings, in depth investigations including blood investigations, neuroimaging and use of assessment tools for her psychopathology and catatonic symptoms. Detailed history evaluation was done through previous clinical notes and parental interviews initially as the child was mute. Later on, when her catatonic symptoms started responding, the child's interviews shed light to fill in the gaps on some details. Extensive liaison with several medical areas was mandatory to find a customized management plan for her. Standardised assessment tools like PANSS and Bush-Francis Catatonia rating scale was used to evaluate her progress and the response of medications. This study underscores the challenges in teasing out evolving symptomatology of psychiatry which may actually be a part of an organic pathology vs. dual pathology. Child's gradual change of behaviour affected her parent's prompt search for any medical causes complicating the matter further. This also emphasizes the importance of good observation skills when there are barriers for detailed history taking. In order to address these issues optimally, multidisciplinary approach with quality nursing care, liaison services and timely interventions are required. Social support with healthy family interactions and continued medical care will help her to reintegrate with society and pursue her academic career which was markedly hindered due to illness presentation.

Keywords: *Catatonic symptoms, Behavioural changes, Multidisciplinary team*

Can infra-inguinal vascular reconstruction be based on duplex ultrasonography alone?

A. M. Alabadaarachchi¹, K. M. A. B. Ilangasekara², P. H. R. S. Mendis², M. R. N. Cassim²

¹*Royal Prince Alfred Hospital, Sydney, Australia*

²*Department of Surgery, Faculty of Medicine, University of Colombo, Sri Lanka*

Duplex Ultrasound (DUS) is a non-invasive imaging modality used in the assessment of Peripheral Arterial Disease (PAD). It serves as the primary imaging tool for infra-inguinal PAD in Sri Lanka. This study compares the DUS findings with the gold standard, Arteriography (DSA). This descriptive cross-sectional study included 145 post-angioplasty patients who had both DUS and DSA. Infra-inguinal PAD was assessed using Global Limb Anatomic Staging System (GLASS) grading, with separate scores for the Femoropopliteal and Infrapopliteal segments. Of 145 patients, 59.3% were male, with a mean age of 66.72 years (31-90). Risk factors included diabetes (97.2%), hypertension (80.7%), IHD (49%), dyslipidaemia (68.4%), smoking (22.1%), CKD (38.6%), and CVA (6.9%). DSA findings showed 40% had extensive disease in both segments, 44.1% had Infrapopliteal, and 15.9% had Femoropopliteal disease. For the Femoropopliteal segment, sensitivity, specificity, positive predictive value, and negative predictive value were 84.21%, 62.32%, 71.11%, and 78.18%, respectively; for the Infrapopliteal segment, these were 90.00%, 34.29%, 81.15%, and 52.17%. Cohen's kappa test indicated moderate agreement ($k=0.44$) for the Femoropopliteal segment and fair agreement ($k=0.30$) for the Infrapopliteal segment. In this cohort, 84.1% had DSA-confirmed Infrapopliteal disease- significantly higher than in developed countries. While existing data show good agreement between DUS and DSA for this segment, our findings indicate only fair agreement, with DUS tending to overestimate disease severity. Given these findings, selective use of alternative imaging such as CTA or implementation of quality assurance programmes for DUS operators should be considered before definitive reconstructions.

Keywords: *DUS, DSA, PAD, GLASS, Sensitivity*

Awareness of physiotherapy as a treatment for urinary incontinence among mothers with pregnancy-related urinary incontinence at two main women's hospitals in Colombo District

S. A. L. Malithi¹, H. W. D. Warawita²

¹*Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Biochemistry and Molecular Biology, Faculty of Medicine, University of Colombo, Sri Lanka*

Urinary incontinence (UI) is a common condition occurring in pregnancy. Despite the global recognition of physiotherapy in managing pregnancy-related urinary incontinence (PRUI), there is a paucity of context-specific evidence regarding its effectiveness in Sri Lanka. This study aimed to determine awareness, knowledge, and attitude toward physiotherapy for pregnancy-related UI among women with PRUI at two main maternity hospitals in Colombo District. A descriptive cross-sectional study was conducted among 100 pregnant women in 3rd trimester diagnosed with PRUI at Castle Street Hospital for Women (Teaching) and De Soysa Hospital for Women, Colombo. Data were collected through interviewer-administrated questionnaires, including a sociodemographic and UI diagnosis questionnaire, a self-developed questionnaire to determine awareness, knowledge, and attitude toward physiotherapy for PRUI. Descriptive statistics and inferential analysis were performed using the SPSS software. Among the 100 participants, majority were between 25 and 35 years old and 58% were housewives while 53%, 39%, and 8% had mild, moderate, and severe UI, respectively. The severity of UI was significantly associated with role limitation, physical limitation, emotional well-being, personal relationships, and quality of sleep ($p < 0.05$). Among them, only 24% had heard of physiotherapy, just 14% were aware of pelvic floor muscle exercises as a treatment option, and only 6% had gone for physiotherapy, indicating a concerning lack of awareness. No significant association was found between awareness and sociodemographic factors including age, number of pregnancies, occupation, educational level, and the area of living ($p < 0.05$). However, 88% of participants showed a willingness to attend physiotherapy if they were referred by a doctor. The study reveals that pregnant mothers have low awareness and knowledge about physiotherapy. However, when informed, they have a positive attitude towards physiotherapy and are willing to attend when referred to physiotherapy, suggesting the need for improved awareness and knowledge.

Keywords: *Urinary incontinence, Pregnancy, Physiotherapy, Knowledge, Awareness*

A cross-sectional study of health-related quality of life and patient satisfaction among stroke patients belonging to different post-stroke time durations, attending the National Hospital of Sri Lanka and the Rheumatology Rehabilitation Hospital

M. G. A. P. Dilshani¹, M. R. N. Cassim²

¹*Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Surgery, Faculty of Medicine, University of Colombo, Sri Lanka*

Stroke is a leading cause of long-term disability, resulting in significant physical, mental, and social impairments that affect Health-Related Quality of Life (HRQOL). Patient satisfaction is an important measure of the quality of healthcare service and highlights unmet needs. Due to limited evidence on how HRQOL and satisfaction with stroke care vary across different post-stroke stages in Sri Lanka, this study aims to assess HRQOL, evaluate patient satisfaction, and identify major complaints among patients at acute, subacute, and chronic post-stroke stages. This descriptive cross-sectional study was conducted among 96 post-stroke patients attending the Neurology Unit of the National Hospital of Sri Lanka and the Rheumatology Rehabilitation Hospital in Ragama. Participants were grouped according to post-stroke duration as acute (<2 months, n=32), subacute (2-6 months, n=32), and chronic (6-12 months, n=32). Data were collected using an interviewer-administered questionnaire, including the Stroke Specific Quality of Life (SSQOL) scale and Satisfaction with Stroke Care Questionnaire (SASC-19). Due to variability in demographic and clinical characteristics (confounding factors) between groups, data were only analyzed descriptively using SPSS version 25.0. The mean age of participants was 58.47 ± 12.593 (acute), 61.00 ± 14.037 (subacute), and 56.31 ± 9.539 (chronic). The total mean scores of the SSQOL for acute, subacute, and chronic groups were 173.09 ± 45.30 , 179.06 ± 36.98 , and 197.66 ± 32.82 . The total mean scores for the home subscale of SASC-19 were 25.09 ± 1.20 (acute), 25.62 ± 1.82 (subacute), and 24.19 ± 1.69 (chronic). Major complaints varied by post-stroke stage: the acute group reported issues in work/productivity, mobility, and upper extremity function; the subacute group in self-care, mobility, and work/productivity; and the chronic group in social life, self-care, and energy. This study highlights stage-specific differences in HRQOL and satisfaction among post-stroke patients in Sri Lanka, indicating a gradual improvement of HRQOL, but confounding factors limited the direct analysis between groups. Identified complaints emphasize the need for tailored long-term rehabilitation to address patient concerns at each stage.

Keywords: *Stroke, Health-Related Quality of Life, Patient satisfaction, Major complaints*

Effect of Body Mass Index (BMI) on quality of life, quadriceps and hamstring muscle strength among female older adults with knee osteoarthritis

N. C. T. E. Nanayakkara¹, A. Wickramasinghe²

¹*Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Psychiatry, Faculty of Medicine, University of Colombo, Sri Lanka*

Knee osteoarthritis (KOA) is the most common form of osteoarthritis. This is influenced by factors such as muscular strength, body composition, quality of life (QoL). This study aims to determine the impact of Body Mass Index (BMI) on quadriceps and hamstring muscle strength and QoL among female adults with KOA attending physiotherapy units of rheumatology clinics at outpatient department (OPD) in the National Hospital of Sri Lanka (NHSL). This descriptive cross-sectional study was conducted at the physiotherapy unit of rheumatology clinics at OPD in NHSL from August to September 2024, involving female participants aged between 50 and 70 years with a confirmed medical diagnosis of grades 3 and 4 bilateral KOA. Demographic data was gathered using a semi-structured interviewer-administered questionnaire. The hand-held dynamometer was used to measure quadriceps and hamstring muscle strength, and the 36-item short form health survey questionnaire was used to measure the QoL. Data were analysed using one-way Analysis of Variance (ANOVA) test from SPSS version 22 software. This study recruited 114 KOA female patients with a mean $\pm$ SD age of 60.15 $\pm$ 4.94 years. There was a statistically significant relationship ($p < 0.01$) between BMI and quadriceps muscle strength of both right leg (mean $\pm$ SD; 38.55 $\pm$ 9.28), and left leg (mean $\pm$ SD 35.21 $\pm$ 8.84). Furthermore, BMI also showed a significant relationship ($p < 0.01$) with hamstring muscle strength in both left leg (mean $\pm$ SD; 34.08 $\pm$ 19.98) and right leg (mean $\pm$ SD 35.21 $\pm$ 8.95). Moreover, BMI demonstrated a statistically significant association ($p < 0.01$) with QoL (mean $\pm$ SD 73.48 $\pm$ 19.73) among KOA patients attending clinics. This study found a significant association between BMI and quadriceps and hamstring muscle strength in knee osteoarthritis patients, potentially affecting physical function. These findings emphasize the importance of incorporating weight management and lower limb muscle strengthening into the treatment strategies.

Keywords: BMI, Quadriceps and hamstring muscle strength, Female adults, QoL, Knee osteoarthritis

Field evaluation of sandfly xenodiagnosis entomological technique for detecting *Leishmania* infection transmission in Sri Lanka

V. S. Kulatunga¹, D. S. Shantha¹, S. A. S. C. Senanayake¹, R. Dewasurendra¹,
T. N. Samaranayake¹, M. P. Kanakkaheewage², N. Karunaweera¹

¹*Department of Parasitology, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Animal Production and Health, Southern Province, Sri Lanka*

Understanding the transmission dynamics of *Leishmania* infection through vector-host interactions is critical for epidemiological surveillance and control of Cutaneous Leishmaniasis (CL) in Sri Lanka. While xenodiagnosis has traditionally been performed under laboratory settings, this study represents the first attempt to assess the feasibility and applicability of xenodiagnoses directly on animals living under natural conditions in the field in Sri Lanka. The study was conducted in Matara and Hambantota Districts in Sri Lanka which are known for a high prevalence of CL. F1 progeny of *Phlebotomus argentipes* sandflies (n=50) were exposed to dogs (n=20) and cattle (n=14) for 30 minutes. Post blood feeding, sandflies were incubated under controlled temperature (26°C) and humidity (80–90%). The fed sandflies were sampled at designated intervals: day 4 and day 8 post-feeding. PCR amplification targeting *Leishmania* DNA was performed to determine infection prevalence. Feeding success was monitored, with average blood-fed female sandflies per host recorded as 11.2 for dogs and 10.6 for cattle. These feeding rates indicate a high level of feeding success (>50%) suggesting that the sandflies are feeding well enough to make the xenodiagnosis method reliable. Although dogs showed a marginally higher sandfly feeding success compared to cattle, no statistically significant difference ($p > 0.05$) was observed in the mean number of blood-fed female sandflies between the two hosts. PCR analysis confirmed absence of *Leishmania* infection in all tested sandflies. This study successfully demonstrates the feasibility of xenodiagnosis under natural field conditions, establishing reliable sandfly feeding on animal hosts and effectively simulates natural transmission dynamics between hosts and vectors. These findings validate the approach as a valuable tool for epidemiological surveillance and enhancing understanding of CL transmission in endemic areas in Sri Lanka.

Keywords: *Xenodiagnoses, Leishmania infection, Phlebotomus argentipes, Vector-host interaction, Molecular detection*

Relationship between pain and functional disability across disease duration in rheumatoid arthritis

R. H. S. Shashiprabha¹, I. Atukorala²

¹*Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Clinical Medicine, Faculty of Medicine, University of Colombo, Sri Lanka*

Rheumatoid arthritis (RA) is a chronic inflammatory, systemic autoimmune disease affecting approximately 1% of the global population. Pain and functional disability are features of the disease and its progression. This study aimed to identify the relationship between pain and functional disability across different disease stages [acute (≤ 3 months), sub-acute ($3 \text{ months} <$), and chronic (≥ 3 years)]. This descriptive cross-sectional study was conducted at the Department of Rheumatology and Rehabilitation (DRR) of the National Hospital of Sri Lanka (NHSL) and the Rheumatology and Rehabilitation Hospital, Ragama (RRH). A total of 75 patients with RA were recruited and categorized into acute, sub-acute, and chronic stages, with 25 participants in each group. Pain severity was assessed using a Visual Analog Scale (VAS), and functional disability was evaluated using the Health Assessment Questionnaire-Disability Index (HAQ-DI). The data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 22. Descriptive statistics and the chi-square test were used to analyze the data. The study found that pain intensity was higher during activities than at rest, with 52% (acute), 48% (sub-acute), and 60% (chronic) reporting moderate to severe pain during activities. At rest, mild to moderate pain was common (48% in acute and sub-acute, 40% in chronic). Most RA patients showed moderate to severe functional disability across all stages. A significant association was found between pain during activities and functional disability ($p < 0.05$), whereas pain at rest was not significantly associated with functional disability. Most RA patients experienced moderate to severe functional disability, with higher pain intensity during activities than at rest. Pain during activities was significantly associated with functional disability, while pain at rest had no effect. These findings underscore the significance of pain management and rehabilitation in preserving hand function and quality of life in patients with RA.

Keywords: *Disease duration (acute, sub-acute, chronic), Pain, Functional disability*

Compliance audit on medico-legal documentation and reporting in University Child and Adolescent Mental Health Services at Lady Ridgeway Hospital for Children

R. Samanmalee¹, A. Herath¹, S. Wickramaratne²

¹*Department of Psychiatry, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Lady Ridgeway Hospital for Children, Sri Lanka*

University Child and Adolescent Mental Health Services (UCAMHS) increasingly engage with assessments related to medico-legal problems involving child maltreatment, parenting capacity, behaviour and mental state assessments and decisions related to child custody. Efficient and timely documentation and reporting are critical for legal and clinical accountability. This audit evaluates compliance with medico-legal documentation standards in UCAMHS at Lady Ridgeway Hospital for Children, Sri Lanka. A retrospective audit was conducted from January 2024 to July 2025, reviewing 58 consecutive medico-legal cases seen at the university-affiliated CAMHS unit. The audit tool assessed demographic profiles, referral quality and referral pathways as well as structured documentation, legal compliance, confidentiality protocols, and staff training. The majority of cases involved children aged 12 years (n = 8, 14.0%), with a slight male predominance (n = 32, 55.2%). The most common referral reasons were behavioural issues (n = 16, 27.6%) and sexual abuse (n = 11, 19.0%). Referral sources were documented in n = 48 (82.8%) of cases, most frequently from juvenile courts (n = 18, 31.0%). A complete account of the event history was available in n = 42 (72.4%), and informant details were recorded in n = 43 (74.1%). Mental state assessments were documented in n = 48 (82.8%), and risk assessments were present in n = 55 (94.8%). Timely submission of medico-legal reports occurred in n = 19 (32.8%) of cases. No clinical case conferences were conducted within 24 hours; however, institutional case conferences were held in n = 17 (29.3%). Confidentiality protocols were adhered to in all cases (n = 58, 100%). Reporting to probation services (n = 27, 46.6%) was more frequent than NCPA-related reporting (n = 5, 8.6%). Follow-up was planned for n = 44 (75.9%) of children, although only n = 23 (39.7%) attended follow-up appointments. The audit identified strengths in confidentiality and clinical documentation but revealed significant delays in reporting and gaps in inter-agency collaboration. Addressing these through clear SOPs, improved discharge planning, and staff training is recommended.

Keywords: *Child mental health, Medico-legal documentation, Child protection, Clinical audit, Sri Lanka*

Comparative evaluation of the lipase-inhibitory potential of *Bacopa monnieri* (L.) Wettst in five different dosage forms: An *in-vitro* study

H. L. N. R. Pradeep¹, P. K. Perera², P. R. Waratenne¹, N. Samaranayake³,
W. D. N. Dissanayake⁴

¹Department of Basic Principles, Ayurveda Anatomy and Physiology, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka

²Department of Ayurveda Pharmacology, Pharmaceutics and Community Medicine, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka

³Department of Parasitology, Faculty of Medicine, University of Colombo, Sri Lanka

⁴Department of Physiology, Faculty of Medicine, University of Colombo, Colombo, Sri Lanka

Bacopa monnieri (L.) Wettst., commonly known as Brahmi, is a traditional medicinal plant recognized for its cognitive, antioxidant, and adaptogenic properties. Recent interest has focused on its potential role in managing metabolic disorders, including obesity, through mechanisms such as pancreatic lipase inhibition. However, the bioactivity of herbal preparations can be significantly influenced by processing techniques. This study investigates the impact of different heat-based preparation methods on the lipase inhibitory activity of *Bacopa monnieri*. This *in vitro* study aimed to evaluate and compare the lipase inhibitory activity of five different *Bacopa monnieri* (L.) Wettst. dosage forms—normal decoction, freeze-dried decoction, powdered plant decoction, aqueous dried plant and freeze-dried plant. The porcine pancreatic lipase (PPL) inhibitory assay was employed to screen each extract at concentrations ranging from 25 $\mu\text{L/mL}$ to 200 $\mu\text{L/mL}$. Extracts demonstrating more than 50% inhibition at 200 $\mu\text{L/mL}$ were further subjected to IC_{50} determination. Each sample (20 μL) was incubated with 10 μL of PPL (4 mg/mL), 10 μL of p-nitrophenyl butyrate (2 μL dissolved in 50 μL DMSO), and 50 μL of Tris-HCl buffer (pH 7.4) at 37°C for 15 minutes. The absorbance of released p-nitrophenol was measured at 405 nm. Orlistat served as the positive control. Due to color interference, concentrations above 300 $\mu\text{L/mL}$ were excluded from analysis. Results showed that several extracts, particularly the freeze-dried forms, exhibited significant lipase inhibitory activity, with IC_{50} values determined for the most potent samples. These findings suggest that processing techniques—especially freeze-drying—substantially influence the functional bioactivity of *Bacopa monnieri*. This study highlights the importance of optimizing preparation methods to enhance the therapeutic potential of herbal products, particularly in addressing lipid metabolism and oxidative stress associated with aging and metabolic disorders.

Keywords: Aging, *Bacopa monnieri*, Herbal formulations, Lipase inhibition, Porcine pancreatic lipase (PPL)

Translation and cultural adaptation of the STARx-Readiness for Transition Questionnaire into Sinhala for adolescents in Sri Lanka

P. B. D. Gomes¹, G. A. N. U. Gurusinghe¹, J. C. Ilangamge¹, S. N. Seneviratne^{1,2}

¹*Centre for Complex Hormonal Diseases, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Lady Ridgeway Hospital for Children, Colombo, Sri Lanka*

Adolescents with chronic diseases in Sri Lanka face disrupted transition from paediatric to adult health-care due to lack of a formal transition process. We translated a transition readiness tool, the “STARx-Readiness for Transition Questionnaire” (STARx-RTQ) into Sinhala language to address the lack of an appropriate tool to assess readiness for transition, and to help facilitate research to ensure smoother transition from paediatric to adult care in Sri Lanka. The translation process was guided by “Translation, adaptation and validation of instruments or scales for use in cross-cultural health care research: A clear and user-friendly guideline” by Valmi *et al*, 'Journal of Public-Health Policy and Health Services Research, 2011. The process involved, forward translations by two independent native Sinhala speakers fluent in English, review by a bilingual panel of experts to resolve any discrepancies and ensure semantic and conceptual-equivalence and cultural appropriateness for Sri-Lanka, and subsequent back translation of the reconciled-Sinhala-version back into English by two other independent bilingual-translators. Subsequently, both English versions were compared, and a few discrepancies addressed, to finalize the Sinhala version of the STARx-RTQ. The Sinhala version was then pilot-tested on a sample of 10 adolescents with chronic conditions to assess comprehension, relevance, and acceptability, which were found to be satisfactory. The original ‘STARx readiness for transition questionnaire’ was translated to Sinhala language successfully using a standard translation process, and pre-tested on 10-adolescent volunteers, suggesting good comprehension and acceptance. The Sinhala translation of the STARx readiness for transition questionnaire could be a useful tool for evaluating readiness for transition among adolescents with chronic medical conditions in clinical settings in Sri Lanka. Further psychometric validation is recommended.

Keywords: *Readiness for transition, Research tool, Chronic diseases, Translated questionnaire Health care research*

Relationship between pelvic girdle pain and health-related quality of life among third-trimester pregnant mothers

K. D. P. Prasanthi¹, I. A. Jayawardane²

¹*Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Obstetrics & Gynaecology, Faculty of Medicine, University of Colombo, Sri Lanka*

Pelvic girdle pain (PGP) is a common musculoskeletal complaint during pregnancy, especially in the third trimester, often impairing physical function and psychological well-being. Its impact on health-related quality of life (HRQoL) is significant but underexplored in the Sri Lankan context. This study aimed to assess the relationship between PGP and HRQoL among third-trimester pregnant mothers at De Soysa Maternity Hospital, Colombo, Sri Lanka. This descriptive cross-sectional study was conducted among 140, third-trimester pregnant mothers (ages 18 – 45) experiencing PGP, recruited via convenient sampling method. Data were collected using an interviewer-administered questionnaire, the pelvic girdle questionnaire and SF-36. Pearson correlation test was used to assess the relationship between PGP severity and HRQoL and data analyzed via SPSS v25. The mean age of participants was 28.33 (SD = ±5.34) years. The mean PGP score was 43.23 (SD = ±7.83), indicating a moderate severity, with 85% of participants experiencing moderate PGP. Significant negative correlation was found between PGP severity and HRQoL scores in both physical ($p < 0.001$) and mental health components ($p < 0.001$). Lower HRQoL was associated with higher PGP intensity. PGP severity among pregnant mothers was high, particularly affecting the lower back. PGP significantly compromises both physical and mental dimensions of HRQoL in third-trimester pregnant mothers. These findings emphasize the importance of addressing musculoskeletal health and promoting interventions tailored to pregnant mothers to enhance their overall well-being during the critical third trimester.

Keywords: *Pelvic girdle pain, Health-related quality of life, SF-36, Third-trimester Pregnant mothers*

Non-invasive management of gastrostomy granulomas in children using table salt: Outcomes from a retrospective review

A. Jayapathum¹, W. Hathagoda^{1,2}, S. Rajindrajith^{1,2}, L. Chandralekha², M. Samarasinghe^{2,3},
I. Rathnayake²

¹*Department of Pediatrics, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Lady Ridgeway Hospital for Children, Colombo, Sri Lanka*

³*Department of Surgery, Faculty of Medicine, University of Colombo, Sri Lanka*

Gastrostomy-related granulation tissue is a frequent complication in children receiving long-term enteral feeding. This study aimed to evaluate the therapeutic effectiveness of table salt as a simple, low-cost treatment for the management of peristomal granulomas in children. A retrospective review was conducted on 52 pediatric patients who received table salt application for gastrostomy granulomas from the clinic database. One session was defined as the application of table salt for 1 hour. The length of the granulation tissue was measured as the largest vertical diameter using a sterile ruler. Of the 52 patients, 25 (48.1%) were male and 27 (51.9%) were female. The mean age was 5.8 years. All patients achieved complete resolution of granulomas by salt application without requiring any surgical interventions. The number of sessions ranged from 1 to 5, with a median of 3 and an interquartile range (IQR) of 2–3. A statistically significant association was observed between initial granulation size and number of sessions required (Kruskal–Wallis $H = 41.53$, $p < 0.001$), with larger lesions needing more sessions. For example, 78% of patients with 3 mm lesions required ≥ 4 sessions. Tube size (16G, 18G, 20G) did not significantly affect treatment duration (Kruskal–Wallis $H = 0.587$, $p = 0.746$). Table salt is an effective, safe, and low-cost treatment for gastrostomy-related granulation tissue in pediatric patients. Given its accessibility and minimal side effects, salt therapy can be recommended as a first-line option, particularly in resource-limited settings.

Keywords: *Granulation tissue, Gastrostomy, Paediatrics*

Assessment of effect of vitamin E supplementation on oxidative stress levels in children infected with Dengue virus in Sri Lanka

Y. L. Basnayake¹, W. Hathagoda², T. Thoradeniya¹, H. W. Dilanthi¹, V. P. Wickramasinghe²

¹*Department of Biochemistry and Molecular Biology, Faculty of Medicine,
University of Colombo, Sri Lanka*

²*Department of Pediatrics, Faculty of Medicine, University of Colombo, Sri Lanka*

Dengue fever (DF) is a health crisis and oxidative stress plays a key role in pathogenesis. Exogenous supplementation of antioxidants can alleviate disease severity and improve recovery rates. This study aims to explore the effects of vitamin E on serum antioxidant levels and its association with overall disease outcomes in children with DF. A controlled clinical trial was conducted at two paediatric units as the treatment group and the control group at a children's tertiary care hospital, enrolling children (5-14 years) with clinically suspected DF admitted within 84 hours of onset of fever. The treatment group, received an age-appropriate vitamin E dose within the first 24 hours of admission. Haematological and serum biochemical parameters [white blood cell (WBC), albumin, calcium] were monitored according to routine management protocols. Serum Trolox equivalent antioxidant capacity (TEAC) and uric acid (UA) were analysed using the ABTS and a colorimetric assay respectively in blood samples collected during routine blood collection. Data were analysed using Graphpad prism 10.4.1. version and Spearman rank correlation analysis was performed to determine the correlations between the parameters. Data of 35 subjects (treatment group N=27 and control group N=8), average age 9 years (IQR=4), admitted on day 3 of illness on average was analysed. Progression of the patients to Dengue Haemorrhagic Fever (DHF) and duration of the leaking phase was lower in the treatment group. The TEAC was improved throughout the course of illness following vitamin E supplementation. Moderate positive correlation was depicted between TEAC and UA ($r = 0.5238$, $p=0.1966$), TEAC and WBC count ($r = 0.5714$, $p=0.1511$) and TEAC and calcium ($r = 0.3810$, $p= 0.3599$). Non-significant negative correlation was identified between TEAC and albumin ($r = -0.6190$ $p = 0.1150$). Definitive establishment of the correlations were limited by the smaller sample size. This preliminary study indicates that vitamin E improves and maintains serum TEAC of dengue patients by improving compensatory serum antioxidants such as UA. Future studies should be carried out with large sample size to further validate these observations.

Keywords: *Dengue Fever; Oxidative stress; Antioxidants; Vitamin E; Serum TEAC*

Environmental sustainability gaps in research laboratories: Findings from an audit at the Faculty of Medicine, University of Colombo

J. A. T. S. Jayaweera, H. W. Dilanthi, S. T. Thoradeniya

*Department of Biochemistry and Molecular Biology, Faculty of Medicine,
University of Colombo, Sri Lanka*

Research laboratories contribute significantly to environmental degradation through energy consumption, water use, waste generation, and hazardous chemical handling. Globally, the pharmaceutical sector, closely linked to laboratory operations, has a carbon emission intensity 55% higher than the automotive industry. Despite this, Sri Lanka lacks structured frameworks to promote sustainable laboratory practices. This project evaluated sustainability practices in selected postgraduate laboratories at the Faculty of Medicine, University of Colombo, to identify critical gaps and develop a locally adaptable intervention. A structured audit was conducted in three postgraduate laboratories using a checklist adapted from internationally recognized frameworks, including LEAF, WHO guidelines, and MyGreen Lab certification criteria. Data were collected through observation, staff interviews, and document review. Compliance in four domains—electricity use, water conservation, waste management, and hazardous chemical handling—was assessed using a four-point scale ("Always", "Sometimes," "Rarely," "No"), adapted from template checklists used in certified accreditation systems. These served as the benchmark for comparing observed practices. To minimize bias, all assessments were conducted by a single trained investigator. Estimated energy use of key equipment was used to approximate carbon emissions. Water conservation had the lowest compliance (22.2%) due to a lack of leak detection and inefficient washing. Waste management scored 53.3%, with moderate reuse and segregation. Electricity conservation scored 36.4%, hindered by unoptimized freezer use and poor organization. Hazardous chemical handling scored 44.8%, with gaps in inventory, spill preparedness, and non-compliance with WHO-recommended storage practices. Equipment emissions exceeded 3 metric tons CO₂, surpassing certified green lab targets (<1.5 t CO₂/lab/year). The audit revealed critical sustainability gaps. The evidence-based SOP developed offers low-cost, standards-aligned interventions. As per the audit cycle, these procedures must be implemented and followed by a re-audit. Institutional adoption and regular audits are essential to reduce the environmental impact of research in Sri Lanka.

Keywords: *Sustainability, Laboratory audit, Research environment, Waste management, Water conservation*

Relationship between lower extremity function and physical activity in older adults with chronic lower extremity pain in selected elderly homes in Kurunegala District

Y. Jayasooriya¹, D. W. Warawitage²

¹*Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Biochemistry and Molecular Biology, Faculty of Medicine, University of Colombo, Sri Lanka*

Physical activity plays a major role in maintaining muscle strength, balance, and functional abilities. Lower extremity function is essential for maintaining mobility and independence in older adults. This study aims to assess the relationship between lower extremity function and physical activity in older adults with chronic lower extremity pain residing in selected elderly homes in the Kurunegala District. A descriptive cross-sectional study was conducted in four selected elderly homes in the Kurunegala District, Sri Lanka. Participants aged 60 years and above with lower extremity pain for three months or more were recruited. Lower extremity pain, lower extremity function, and physical activity level were assessed using the self-reported questionnaire, Short Physical Performance Battery (SPPB), and International Physical Activity Questionnaire -Short Form (IPAQ-SF), respectively. Data were analyzed using descriptive statistics and the Spearman correlation test in SPSS version 22.0. Among the 96 participants, 63.5% were female with a mean age of 75.72 (SD±7.76) years. The prevalence of pain in the knee was the highest (73.95%), and the right side (61.45%) of the knee was more affected than the left side (52.08%). The majority of the participants (78.1%) had low physical activity levels, and none were categorized as highly active. The mean SPPB score was 5.67 (SD±2.76), indicating an intermediate level of lower extremity function overall. A significant, strong positive correlation between the lower extremity function and physical activity ($r=0.608$, $p < 0.001$), suggesting that better lower extremity function is linked to greater physical activity in institutionalized older adults with chronic lower extremity pain. The findings indicate that higher lower extremity function is associated with better physical activity in this population. These results highlight the need for interventions aimed at improving lower extremity function to promote physical activity and potentially enhance mobility and independence among institutionalized older adults.

Keywords: *Chronic pain, Physical activity, Lower extremity function, Older adults*

Paternal depression amongst expectant fathers in a suburban area in Sri Lanka

S. A. V. W. Wijesinhe¹, J. C. Chuwan¹, W. A. I. C. Wijesinghe¹, J. C. Ilangamge¹,
C. Suraweera¹, S. Fernando²

¹*Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Medical Humanities, Faculty of Medicine, University of Colombo, Sri Lanka*

The transition to parenthood is an important time that necessitates adjustments for both parents, which may result in depression. Paternal depression, though significant, remains less studied locally and globally, compared to maternal depression. Raising awareness of paternal depression in society will reduce the impact on social health. Expectant fathers (N=120) were recruited via stratified sampling to this descriptive cross-sectional study in the post- and antenatal clinics in the Gothatuwa Medical Officer of Health (MOH) area. Data were collected via interviewer-administered questionnaires. Edinburgh-Postpartum-Depression-Scale (EPDS) was used to assess paternal depression, and the pre-tested and modified questionnaire was used to assess the risk factor. Data were analyzed using SPSS. Prevalence of paternal depression, socio-demographic, psychological, behavioural, and pregnancy-related factors were evaluated via frequency distributions. The chi-square test was used to examine associated factors. Ethical clearance was obtained from the Ethics Review Committee of the Faculty of Medicine, University of Colombo. Of the sample, 11.7% (n=14) were found to have an Edinburgh-Postpartum-Depression-Scale (EPDS) score of 9 or higher, with the mean score being 6.31(SD=2.49). There were no high-risk depression cases (EPDS>12) reported. There was a statistically significant correlation between paternal age (p=0.003), marital satisfaction (p=0.004), family support (p=0.012), smoking (p=0.015), and having other children (p=0.034). Paternal depression needs attention and action. The range of paternal depression throughout pregnancy and its impact on the spouse and family should be further researched. Greater efforts at creating awareness and tackling paternal depression through the public health system are recommended.

Keywords: *Paternal depression, Postpartum, Antepartum, Men's health*

Prevalence and factors associated with work-related musculoskeletal discomfort among carpenters in Moratuwa Divisional Secretariat, Sri Lanka

M. A. M. Amhar, K. R. M. Chandrathilaka

Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka

Musculoskeletal (MSK) discomfort is a common occupational health problem among carpenters. The current study aimed to determine the prevalence and associated factors of musculoskeletal discomfort among carpenters in selected Grama Niladhari divisions in Moratuwa Divisional Secretariat, Sri Lanka. This descriptive cross-sectional study was conducted among 155 carpenters recruited using a two-stage random sampling method from the Moratuwa Divisional Secretariat. Individuals with at least 1 year of experience as a carpenter were included. Interviewer-administered questionnaires were used to collect data. The Nordic Musculoskeletal Questionnaire was used to assess MSK discomfort, and pain intensity was evaluated by the Numerical Pain Rating Scale. The study used Karasek's Job Demand-Control-Support (JDCS) model to assess psychosocial exposures. Descriptive statistics and the chi-square test were used to analyze data. The response rate was 91.6% (n=142). The prevalence of MSK discomfort in one or more body regions was 92.3% (n=131) during the past 12 months and 78.9% (n=112) during the past 7-day period. Shoulder pain was the most prevalent region of MSK discomfort in the last 12 months (65.4%), followed by lower back pain (62.0%). During the last 7-day period, the lower back region was the most prevalent. Age ($p=0.001$), educational level ($p=0.003$), psychosocial demand ($p=0.001$), level of fatigue after work ($p=0.001$), and working posture ($p=0.001$) were significantly associated with MSK discomfort in at least one body region during the last 12 months. Region-wise analysis revealed significant associations ($p<0.05$) between MSK discomforts and age, BMI, education level, working posture, regular exercise, service period, fatigue level, and smoking habits. MSK discomfort among carpenters is high. Shoulder, lower back, knee and elbow are more prone to developing MSK discomforts from carpentry. Findings of the study highlight that carpenters' work postures need to be investigated, and that ergonomic and occupational health measures are needed to improve working conditions and reduce future musculoskeletal discomfort.

Keywords: *Work-related musculoskeletal discomfort, Occupational health, Ergonomics*

Trends in depression in Sri Lanka: Findings from the SLHAS 2018-2024

L. S. Constantine¹, S. Kumar², R. P. Rannan-Eliya³, S. D. Amarasuriya¹

¹*Department of Medical Humanities, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Agricultural Economics and Business Management, Faculty of Agriculture,
University of Peradeniya, Sri Lanka*

³*Institute for Health Policy, Colombo, Sri Lanka*

Sri Lanka recently experienced the COVID-19 pandemic, political turmoil, and an economic crisis, all potentially implicating nationwide mental health. Yet, the differential impact of crises on population subgroups remained understudied. Thus, we examined the trends in depression between 2018–2024 in Sri Lanka, and investigated the disparity in depression between subgroups during this period. Data for this study are from Waves 1 (2018/2019) and 2/2x (2021/2024) of the Sri Lanka Health and Ageing Study (SLHAS) – a nationally representative longitudinal study that recruited 6,668 non-institutionalised adults in its first wave. Depressive symptoms were measured by the 8-item Patient Health Questionnaire (PHQ-8), with a cut-off score of 5 indicating mild depression. Linear mixed models were fitted to predict the prevalence of mild depression and adjusted mean PHQ-8 score by month, with age, sex, ethnicity, education level, sector of residence, and socioeconomic status as predictors. Marginal predictions of the mean PHQ-8 score by month were obtained by demographic subgroup by including interaction terms in the models. Preliminary results show fluctuating trends in depression over time, increasing following the economic and political crisis. Women, older individuals, and those with lower education reported higher depression. Depression symptoms in Sinhalese individuals demonstrated a stable trend, whereas the other ethnic groups displayed greater fluctuations. The gap in depression between socioeconomic subgroups narrowed during the crisis period. However, depressive symptoms in the most disadvantaged group rose the most, post-crisis, while that of the highest socioeconomic bracket remained the lowest. The findings suggest disparities in depression between demographic groups during crises in Sri Lanka. Specifically, disadvantaged groups experience more depressive symptoms after crises, indicating that focused attention is needed on these populations during such periods.

Keywords: *Depression, Time trend, Sri Lanka, PHQ-8, Mental health*

Uncovering the spectrum of inherited risk in colorectal cancer: A scoping review of low- and moderate-penetrant germline variants

K. Thillainathan, N. D. Sirisena, V. H. W. Dissanayake

*Department of Anatomy, Genetics & Biomedical Informatics, Faculty of Medicine,
University of Colombo, Sri Lanka*

It is well known that inherited colorectal cancer (CRC) risk is linked to high-penetrant germline variants in cancer-predisposing genes. However, recent studies highlight the significance of low- and moderate-penetrant genetic variants as well. This scoping review summarizes the current evidence on such variants, with a focus on their distribution, clinical correlation, and prevalence in different populations. A comprehensive search was conducted across PubMed, Scopus, Web of Science, and Google Scholar to identify studies published in English from January 2010 to April 2025. Eligible studies documented low- to moderate-penetrant germline variants linked to CRC, supported by either statistical associations or functional evidence. Out of 697 studies screened, 171 met the inclusion criteria, reporting 422 unique variants across 282 genes. The most frequently reported genes included MUTYH (5.7%, OR 1.1–2.8), CHEK2 (5.7%, OR 1.5–2.0), SMAD7 (5.7%, OR 1.2), ATM (3.9%, OR 1.6), BMP4 (3.9%, OR 1.1–1.2), BMP2 (3.6%, OR 1.1–1.2), TP53 (3.6%, OR 1.2–1.7), GALNT12 (3.2%, OR 1.8), and EIF3H (3.2%, OR 1.2–1.7), all with $p < 0.05$. Key variants included CHEK2: c.1100delC (2.4%); SMAD7: rs4939827 (2.1%), BMP4: rs4444235 (2.1%), GREM1: rs4779584 (2.1%), and an enhancer variant rs6983267 near the MYC gene (2.8%). Biallelic MUTYH variants were linked to early-onset, proximal colorectal cancer and polyposis, while the ATM:rs189037 variant was associated with rectal tumors and poorly differentiated neoplasms. Other variants did not show consistent clinical patterns. The study populations were predominantly Caucasian (56.5%), with limited data from other regions. Notably, MDM2:rs2279744 (0.5%, OR 1.2–2.1) was mainly reported in Asian populations. Low- and moderate-penetrant germline genetic variants significantly contribute to inherited CRC risk. However, clinicopathological correlations remain underexplored, and population diversity is lacking. Future research should focus on increasing population representation and conducting functional validation of variants to improve risk assessment and translate findings into personalized screening and prevention strategies.

Keywords: *Colorectal cancer, Germline variants, Low-penetrant, Moderate-penetrant, Genetic susceptibility*

How depressed are we? Prevalence of depression in Sri Lanka (2018-2019)

S. Kumar¹, U. B. E. Sasanka², S. Amarasuriya³, R. P. Rannan-Eliya⁴

¹*Department of Agricultural Economics and Business Management,
University of Peradeniya, Sri Lanka*

²*Department of Agribusiness Management, Faculty of Agricultural Sciences,
Sabaragamuwa University of Sri Lanka*

³*Department of Medical Humanities, Faculty of Medicine, University of Colombo, Sri Lanka*

⁴*Institute of Health Policy, Colombo, Sri Lanka*

Depression is a leading cause of disease burden and continues to be an ever-growing concern worldwide. While rates of depression are well studied in high-income countries, prevalence in low- and middle-income countries remains less understood. In Sri Lanka, the 2007 National Mental Health Survey (NMHS), which excluded the North and East due to ongoing civil conflict at the time, remains the most comprehensive source on Sri Lanka's depression prevalence. However, the NMHS is almost two decades old. More recent smaller cohort studies would suggest that rates of depression vary significantly across different sub-populations. Yet, due to inconsistencies in study design, assessment tools, and diagnostic criteria, whether these differences reflect true variation or are methodological artifacts is unclear. Furthermore, the recent national crises (e.g., the COVID-19 pandemic and the economic collapse) affected large segments of the population. However, due to the absence of robust baseline data, it has been difficult to assess the mental health impact of these events. This study reports pre-crisis baseline statistics on depression, which can inform future research. Using data from a nationally representative sample of 6,627 participants from the first wave of the Sri Lanka Health and Ageing Study (SLHAS), conducted between mid-November 2018 and mid-November 2019, we assess rates of depression using the PHQ-9 scale. Multiple imputation was employed to address missing data. Our findings show overall depression rates lower than those reported in the NMHS. Descriptive statistics and logistic regression were used to explore subgroup variation, revealing significant differences in depression prevalence by region, gender, age, ethnicity, marital status, socioeconomic status, and certain health indicators. Results indicate that vulnerable populations experience disproportionately higher rates of depression, underscoring the need for targeted policy interventions that take these vulnerabilities into consideration and prioritize mental health support for at-risk groups.

Keywords: *Mental health, Depression prevalence, Sri Lanka, PHQ-9*

The relationship between musculoskeletal pain, work-related posture and quality of life among jewellery manufacturing workers in Colombo District, Sri Lanka

A. G. A. N. Yasandi¹, M. R. N. Cassim²

¹*Department of Allied Health Sciences, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Surgery, Faculty of Medicine, University of Colombo, Sri Lanka*

Jewellery manufacturing workers are often exposed to prolonged static postures, repetitive upper limb movements, and poorly designed workstations. These occupational stressors increase the risk of developing musculoskeletal (MSK) pain and may negatively affect their quality of life (QOL). This study aimed to assess the relationship between MSK pain, work-related posture, and QOL among jewellery manufacturing workers in the Colombo District, Sri Lanka. An analytical cross-sectional study was conducted among 134 jewellery manufacturing workers selected through a two-stage random sampling method. Participants aged 18-60 years with at least two years of work experience were eligible. Data were collected using an interviewer-administered questionnaire, the Nordic Musculoskeletal Questionnaire (NMQ), Rapid Entire Body Assessment (REBA), and the SF-36 questionnaire. Statistical analysis was conducted using SPSS version 25, utilizing descriptive statistics and the Mann-Whitney U test. MSK pain was reported by 87.3% of participants during the past 12 months, with lower back being the most affected region (62.7%). In the past 7 days, 66.4% of participants experienced MSK pain, with lower back pain remaining the most common (30.6%). REBA analysis showed that 64.9% of workers were in the medium-risk category. A significant association was found between MSK pain and higher REBA final scores, particularly for the pain in neck, elbow, upper back, lower back, and knee regions ($p < 0.05$). MSK pain was also significantly associated with lower physical component scores (PCS) of QOL ($p < 0.05$), while no significant association was found with mental component scores (MCS) ($p > 0.05$). MSK pain is highly prevalent among jewellery manufacturing workers and is strongly associated with poor working posture and reduced physical quality of life. Targeted ergonomic interventions and occupational health strategies are essential to reduce MSK burden and improve workers' health and productivity.

Keywords: *Musculoskeletal pain, Work-related posture, Quality of life, Jewellery manufacturing workers*

Factors affecting willingness for live and deceased organ donation in a Sri Lankan urban community

A. Chandrakumar¹, N. S. B. O. C. Atapattu¹, K. G. I. Y. Bandara¹,
K. S. M. T. D. G. Bandara¹, D. R. Wijayaratne²

¹*Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Clinical Medicine, Faculty of Medicine, University of Colombo, Sri Lanka*

Understanding the factors that influence the willingness to donate organs is important to increase the availability of organs for transplantation. This study assessed the willingness of Sri Lankans to donate organs and explored the factors associated with that decision. 144 adults from the Dehiwala Medical Officer of Health area, selected using random area sampling, took part in this community-based cross-sectional study. An interviewer-administered questionnaire, adapted from validated tools and refined with expert input, was used to collect data on sociodemographic factors, knowledge, attitudes, and existing practices concerning live and deceased organ donation. Twenty selected questions were scored independently by experts, and a score of 70% or more was considered ‘good knowledge’. The mean age was 46 years and 47% were male. The highest level of education for most participants was GCE A/L. A majority (52.78%) demonstrated good knowledge. The percentage of participants who expressed willingness to engage in deceased donation (DD) was substantially higher (81.1%) compared with live donation (LD) (30.8%). As high as 94.7% of the respondents with good knowledge expressed willingness for DD compared to 51.5% for LD ($p=0.003$). Willingness for LD showed a positive association ($p<0.05$) with prior awareness of organ donation and family approval. Willingness for LD was not significantly influenced by ethnicity. There was a strong association between Islam and unwillingness to donate after death ($p < 0.001$). Having donated blood or organs previously, having a chronic disease, or having a family member with a chronic disease was not significantly associated with willingness for either LD or DD. “Save someone’s life” was the most common motivation for both LD (97.7%) and DD (94%). “Religious beliefs” (78.9%) was the most common reason for unwillingness for DD. A majority of participants expressed favourable attitudes toward deceased organ donation. The findings highlight the need for culturally sensitive, targeted awareness programmes to enhance organ donation practices in Sri Lanka.

Keywords: *Organ donation, Live, Deceased, Socio-cultural factors*

Patient awareness and complications of arteriovenous fistula created for haemodialysis access: A case series

M. B. A. D. Samarawickrama¹, A. P. N. B. Samanmali¹, C. D. Samarawickrama¹,
R. Samphel¹, J. Arudchelvam²

¹*Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Surgery, Faculty of Medicine, University of Colombo, Sri Lanka*

Haemodialysis is a lifesaving renal replacement therapy for End Stage Renal Failure which represents a growing health burden in Sri Lanka. Arteriovenous fistula (AVF) is the preferred long-term vascular access due to lower complication rates compared with alternatives, but complications such as stenosis, thrombosis, and infection remain significant. Patient awareness and adherence to self-care practices can reduce complication severity, improve quality of life, and ease healthcare demands. Local studies on AVF-related complications and awareness are scarce. The aim of this study was to determine the proportion of AVF complications and assess awareness and self-care practices related to AVF among haemodialysis patients at the National Hospital of Sri Lanka (NHSL). A descriptive cross-sectional study was conducted among 120 haemodialysis patients at the NHSL in August 2024. Data on patient demographics, comorbidities, AVF history, awareness, and practices were collected via an expert-validated, interviewer-administered questionnaire. Awareness and practices were graded as good, satisfactory, or poor. Statistical analysis on SPSS used frequencies, proportions, and chi-square tests for associations. Mean participant age was 49.9±14.1 years; 73.3% were male. Hypertension (73.3%) and diabetes mellitus (66.7%) were the leading causes of renal failure. Increased venous pressure (68.3%) was the most common intradialytic complication; infections (14.2%) and thrombosis (8.3%) were the leading AVF-related complications. Overall, 65.0% demonstrated good awareness on AVF related complications and 70.0% demonstrated good self-care practices; poor awareness and practices were observed in 15.0% and 7.5%, respectively. Mean awareness and practice scores were 11.96 out of 16 and 9.29 out of 12. Better awareness was significantly associated with age 35–65 years but not with education or gender. AVF complication prevalence was 28.33%, with infections being the most frequent. Good awareness correlated with better self-care practices. Enhanced comorbidity control and targeted patient education are recommended to optimize AVF outcomes.

Keywords: *Hemodialysis, Arteriovenous fistula, Sri Lanka*

Occurrence of the Kappa-Casein allele B in the white cattle breed reared in government farm of Department of Animal Production and Health in the Eastern Province

M. S. M. Sharaz¹, M. S. K. Rabindrakumar¹, M. I. G. Jayathilaka², S. T. Thoradeniya³

¹*Department of Life Science, Faculty of Science, NSBM Green University, Sri Lanka*

²*Livestock Development Division, Ministry of Agriculture, Livestock, Land and Irrigation, Sri Lanka*

³*Department of Biochemistry & Molecular Biology, Faculty of Medicine,
University of Colombo, Sri Lanka*

The CSN3 gene encoding kappa-casein (κ -CN), significantly affects both nutritional and health related qualities of milk, making it a candidate gene in marker-assisted selective breeding. Among the κ -CN gene variants, the B allele is associated with higher nutritional content and enhanced bioactive peptide benefits, including anti-inflammatory, antioxidant, antimicrobial, anticancer, antidiabetic, and anti-obesity effects. Hence, determining the presence of the B allele in the indigenous White Cattle breed of Sri Lanka is crucial for improving milk traits. Accordingly, this study aimed to optimize a PCR-RFLP method for CSN3 gene analysis and to examine allele and genotype frequencies in this cattle breed. A facility-based study was conducted on 28 healthy White Cattle at the White Cattle Preservation and Development unit, of Eastern Provincial Department of Animal Production and Health, located in Vakara, Batticaloa District. Genomic DNA was extracted from 20 blood samples of cattle that fulfilled the inclusion criteria. The study was approved by the Ethics Review Committee, Faculty of Medicine, University of Colombo (EC-24-148). The optimized PCR protocol consisted of an initial denaturation at 95°C for 5 minutes, followed by 35 cycles of denaturation at 94°C for 45 seconds, annealing at 56°C for 45 seconds, and extension at 72°C for 1 minute. Among the 20 cattle, seven (35%) exhibited the AB genotype, while thirteen (65%) had the AA genotype. None of the cattle possessed the BB genotype. Accordingly, the frequency of the A allele was higher (82.5%) compared to the B allele (17.5%). The study findings provide the first molecular insight into kappa-casein allele and genotype frequencies in the White Cattle breed in Sri Lanka. The presence of the B allele is a promising indicator of genetic potential for improved milk properties in this breed and lays the foundation for selective breeding and conservation strategies for indigenous cattle populations.

Keywords: *Kappa-Casein, CSN3 gene, White Cattle, Allele frequencies, Genotype frequencies*

Prevalence, knowledge, and practices related to needlestick injuries among third-year nursing students at the College of Nursing, Colombo

D. Perera, G. Perera, T. Perera

Faculty of Medicine, University of Colombo, Sri Lanka

Needle stick injuries (NSIs) occur when a needle accidentally punctures the skin, usually in healthcare settings. They are a major occupational hazard for healthcare workers and, nursing students are especially vulnerable due to limited knowledge, experience, and training. NSIs commonly occur during procedures like venipuncture and sharps disposal. Prevention is vital and includes using safer devices, proper disposal, adequate training, and adherence to post-exposure protocols. We aimed to describe the prevalence, knowledge and practices regarding NSIs among students in the College of Nursing, Colombo. A descriptive cross-sectional study was conducted on 116 third-year nursing students at the College of Nursing, Colombo using systematic sampling. A structured, validated, pre-tested, self-administered questionnaire was developed to obtain data. Data were subjected to analysis using both descriptive statistics and chi-square tests using SPSS statistical software version 27. Vast majority (96.6%, n=112) were female, with an average of 25.17 (SD=0.989). The prevalence of NSIs was 21.7% (n=24) with only 33.3% reporting the incident, and just 20.8% undergoing post-exposure prophylaxis. Mean knowledge score was 9.18% with most (56.9%) demonstrating poor knowledge regarding NSI prevention, particularly regarding post-exposure protocols (65.5% unaware of need for immediate washing and medical attention). Only 51.7% knew the correct reporting procedure. Regarding practice, 59.5% showed unsafe habits: 43% admitted to recapping needles, and 38% disposed of sharps improperly. Hepatitis B vaccination completion was reported by only 41.4%. No statistically significant associations were found between prior NSI experience and higher knowledge or practice scores. There is a high prevalence of NSI among nursing students in our setting. Knowledge and practices regarding prevention of NSI were poor. Regular training is recommended on prevention and post-exposure practices. Ensuring full vaccination against hepatitis B virus is recommended due to the risks of occupational exposure.

Keywords: *Needlestick injury, Knowledge, Practices Prevalence, Nursing students*

The neuroprotective potential of red cabbage (*Brassica oleracea* L. var. *capitata* f. *rubra*) in Parkinson's disease: A systematic review

M. S. F. Sapra¹, M. I. Manuha¹, P. K. Perera², W. D. N. Dissanayake³

¹Department of Unani Pharmacology, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka

²Department of Ayurveda Pharmacology, Pharmaceutics and Community Medicine,
Faculty of Indigenous Medicine, University of Colombo, Sri Lanka

³Department of Physiology, Faculty of Medicine, University of Colombo, Sri Lanka

Parkinson's disease (PD) is a progressive neurodegenerative disorder and a major contributor to global morbidity. Oxidative stress, neuroinflammation, and mitochondrial dysfunction are central to its pathogenesis, yet current therapies remain primarily symptomatic. Red cabbage (*Brassica oleracea* L. var. *capitata* f. *rubra*), traditionally recognized in *Unani* medicine as *Kurnub* for its effects on tremor, is rich in anthocyanins, sulforaphane, and other phytochemicals. This review aims to systematically assess the literature on the neuroprotective potential of red cabbage and its bioactive constituents in PD. A systematic literature search was conducted following PRISMA guidelines using PubMed, Scopus, Google Scholar, and ScienceDirect (2014–2024). Only preclinical studies were included. Eight studies met the inclusion criteria. The reviewed studies used either whole red cabbage extracts or isolated compounds derived from it (e.g., sulforaphane, anthocyanin extracts). Findings indicated that these interventions enhanced antioxidant defences, decreased neuroinflammation, preserved mitochondrial function, and improved motor outcomes in *in vitro* PD models. However, no clinical trials in humans were identified, highlighting a major translational gap. Current evidence suggests that red cabbage constituents may provide neuroprotection through multiple pathways. Future research requires standardized formulations, pharmacological validation, and well-designed clinical studies to assess efficacy and safety in humans. These findings support the potential of red cabbage as a source for novel adjunctive therapies in PD.

Keywords: *Parkinson's disease, Red cabbage, Neuroprotection, Anthocyanins, Sulforaphane*

FACULTY OF ARTS



*Thinking Together: Collaborative Humanities and Social Sciences
for Global Resilience*

20th November 2025

MESSAGE FROM THE DEAN

Senior Professor Lasantha Manawadu

*Faculty of Arts
University of Colombo
Sri Lanka*



I am truly pleased to extend a warm welcome to you all to the 11th International Conference on Humanities and Social Sciences (IConArts 2025), which is being hosted by the Faculty of Arts, University of Colombo. In an era increasingly defined by uncertainty, transformation, and interconnected global challenges, this year's theme, "Thinking Together: Collaborative Humanities and Social Sciences for Global Resilience," highlights the vital importance of interdisciplinary dialogue and cooperation. The humanities and social sciences not only help us comprehend these complexities but also equip us with the insight needed to build resilience through shared knowledge and collaboration.

The academic community plays a pivotal role in charting the path toward global resilience. Through research and scholarship, we examine the human experience, question existing paradigms, and develop innovative solutions that transcend cultural and geographical boundaries. By fostering collaboration across disciplines and nations, we strengthen intellectual frameworks that enable societies to respond to crises, uphold human dignity, and pursue inclusive and sustainable growth.

I wish to express my heartfelt appreciation to the Vice-Chancellor of the University of Colombo, Professor Indika Mahesh Karanathilake, for his unwavering support and guidance, which have been pivotal in making this conference a reality. I also extend my heartfelt thanks to the Conference Co-Chairs and the Organising Committee for their tireless efforts and dedication in ensuring the success of IConArts 2025. As we engage in the exchange of ideas, research, and perspectives, I am reminded of the vital role the humanities and social sciences play in advancing knowledge and shaping our understanding of a rapidly changing world. May this conference serve as a platform to inspire collaboration, foster resilience, and reaffirm the enduring relevance of our disciplines.

MESSAGE FROM THE SYMPOSIUM CO-CHAIRS



Professor Manori Weeratunga

*Department of Demography
Faculty of Arts, University of Colombo
Sri Lanka*



Dr. Asitha De Silva

*Department of Geography
Faculty of Arts, University of Colombo
Sri Lanka*

It is with great pride and enthusiasm that we welcome you to the 11th International Conference on Humanities and Social Sciences (IConArts 2025), organised by the Faculty of Arts, University of Colombo. This year's theme, "Thinking Together: Collaborative Humanities and Social Sciences for Global Resilience," underscores the importance of uniting knowledge, perspectives, and practices to address the pressing issues of our time. By fostering collaboration across disciplines, we open new avenues for dialogue that enrich our academic community and strengthen our ability to confront global challenges. In particular, the theme of IConArts 2025 highlights the crucial role of partnerships between academia, industry, policymakers, and other stakeholders. In today's interconnected world, no single field or sector can provide all the answers. Collaboration across boundaries is essential to building sustainable, inclusive, and resilient societies. This conference provides a unique platform for researchers and practitioners to share their insights, strengthen networks, and inspire collective action that will resonate well beyond these sessions.

We sincerely thank the members of the Organising Committee for their dedication, hard work, and innovation in bringing this conference to a success. We also like to thank the Vice-Chancellor of the University of Colombo, Professor Indika Mahesh Karunathilake, for his unwavering support and the Dean of the Faculty of Arts, Senior Professor Lasantha Manawadu, for his leadership and encouragement throughout this journey. As we reflect on the discussions that will take place at this conference, we want to convey a clear message: the humanities and social sciences are not peripheral, but rather vital to crafting a robust future. Let us continue to think, work, and build together so that our collective knowledge can illuminate the path to a more just, inclusive, and prepared world for the challenges that lie ahead.

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SYMPOSIUM PROGRAMME

8.00 am – 8.30 am	Registration of Participants
8.30 am – 8.40 am	Lighting of the Traditional Oil Lamp and National Anthem
8.40 am – 8.45 am	Cultural Item
8.45 am – 8.55 am	Welcome Address <i>Conference Co-Chairperson, Professor Manori Weeratunga</i>
8.55 am – 9.05 am	Address by the Dean <i>Senior Prof. Lasantha Manawadu</i>
9.05 am – 9.15 am	Address by the Vice-Chancellor <i>Prof. Indika Mahesh Karunathilake</i>
9.15 am – 9.20 am	Introduction to the Keynote Speaker – I
9.20 am – 9.35 am	Keynote Address – I <i>Prof. Prabha Manurathne, University of Kelaniya</i>
9.35 am – 9.40 am	Introduction to the Keynote Speaker – II
9.40 am – 10.00 am	Keynote Address – II <i>Prof. Richard Haigh, University of Huddersfield, UK</i>
10.00 am – 10.05 am	Cultural Item
10.05 am – 10.10 am	Introduction to the Keynote Speaker – III
10.10 am – 10.25 am	Keynote Address – III <i>Prof. Ranjith Dissanayake, University of Peradeniya</i>
10.25 am – 10.30 am	Launch of the Conference Proceedings
10.30 am – 10.40 am	Presentation of Tokens of Appreciation
10.40 am – 10.45 am	Vote of Thanks <i>Conference Secretary, Ms. Sandaru Diwakara and Ms. K. Rewathy</i>
10.45 am – 11.30 am	Refreshments
11.30 am – 1.00 pm	Session ONE
1.00 pm – 2.00 pm	Lunch
2.00 pm – 3.30 pm	Session TWO
3.30 pm - 5.00 pm	Session THREE
5.00 pm – 5.30 pm	Closing Remarks, Networking, and Refreshments

INTRODUCTION TO KEYNOTE SPEAKER – I

Professor S. A. Prabha Manuratne

*Department of English
University of Kelaniya
Sri Lanka*



Professor Prabha Manuratne is a highly respected academic at the Department of English, Faculty of Humanities, University of Kelaniya, Sri Lanka. Her scholarly expertise lies in critical theory, cultural studies, and postcolonial literature, areas in which she has made significant contributions through research, teaching, and publications. Professor Manuratne has served as the Head of the Department of English and has been instrumental in advancing academic excellence and innovation within the faculty. Beyond her departmental leadership, she has contributed to the University's broader educational mission through her active involvement with the Center for Distance and Continuing Education, promoting inclusive and accessible higher education.

Widely recognized for her intellectual rigour and commitment to the humanities, Professor Manuratne continues to play a leading role in shaping contemporary literary and cultural scholarship in Sri Lanka and beyond.

ABSTRACT OF THE KEYNOTE ADDRESS – I

Transdisciplinarity at the Margins: Thinking Resilience and Collaboration in the Humanities and Social Sciences

Professor S. A. Prabha Manuratne

Department of English, University of Kelaniya, Sri Lanka

This keynote will focus on two key thematic strands of this conference: “thinking together” and “resilience.” Collaborative research has become a buzzword in both humanities and social sciences research, but researchers rarely pause to ask what “thinking together” actually entails. Instinctively, we think of “thinking” as an isolated act, an isolating act, even an act of seeking isolation. However, when coupled with “together,” it leads to a series of epistemological questions about the shared frameworks that determine how knowledge is produced, marking the collective nature of even the most “individual thinking.” In the first part of this analysis, I turn to the epistemological problem of disciplinary frameworks that enable or disable collective thinking. To do so, I revisit the first chapter of Immanuel Wallerstein’s *World Systems Analysis* (2004), an important text in the social sciences, and juxtapose it with Mafred Max-Neef’s essay titled “Foundations of Transdisciplinarity” (2005). By putting these two very different texts into conversation, I hope to argue that to “think together” we must contextualize disciplinarity historically (as does Wallerstein) and identify the synchronic forms of transdisciplinary action that are both systemic and holistic. To situate this theoretical reading, I will analyze selections from the 200+ Beyond the Struggle Photography exhibition that captured the experiences of the Malaiyaha community. I argue that arts, humanities, and social sciences projects that engage with transdisciplinary action render the framework itself as an “open project” (Max-Neef 2005, 15), an incomplete text, an invitation to “think together.” In the second part of the analysis, I turn to what “global resilience” means. Recent scholarship on resilience tends to take the “social ecology of resilience as the dominant paradigm (Marie, Mohammad et al. 2018, n.p.). Drawing on my own research on the Palestinian novelist Sahar Khalifeh, I will examine the political and ethical dilemmas posed by the Palestinian concept of “*sumud*,” often linked to the idea of resilience, and point to the deeper crises that demand a demystification of the ethical calls to resilience. The key argument of this paper is that transdisciplinarity poses collective thought and action itself as a political and ethical choice, and that the common call to “resilience” must be read within holistic epistemologies that render it as an “open project” rather than a moral dictate.

INTRODUCTION TO KEYNOTE SPEAKER – II

Professor Richard Haigh

*Affiliated Professor and External Supervisor
University of Huddersfield
UK*



Professor Richard Haigh is an affiliated professor and external supervisor at the University of Huddersfield. He works as a consultant, advising on research, education and advocacy in disaster risk reduction and resilience. Professor Haigh's career reflects a truly global commitment to advancing resilience in the built environment and disaster risk reduction. As Co-Director of the Global Disaster Resilience Centre at the University of Huddersfield, and Founding Editor-in-Chief of the International Journal of Disaster Resilience in the Built Environment, he has created international platforms for knowledge sharing and collaboration. His leadership has extended to co-chairing multiple international conferences on building resilience, and contributing directly to the development of global frameworks through his advisory roles with the United Nations International Strategy for Disaster Reduction (UNISDR) and the Government of Sri Lanka. Notably, he has played a central role in shaping the United Nations “Words into Action” guides, ensuring that principles of governance, accountability, and construction practice are embedded into the Sendai Framework for Disaster Risk Reduction. With invited speeches and keynote addresses delivered across six continents, and significant contributions to UN and UNESCO initiatives, Professor Haigh's influence spans from academic research to policy impact, inspiring resilience strategies at both local and global scales.

ABSTRACT OF THE KEYNOTE ADDRESS – II

Addressing Systemic, Cascading, and Compound Risks for a Resilient Society

Professor Richard Haigh

Affiliated Professor and External Supervisor, University of Huddersfield, UK

Recent events have revealed how systemic risks challenge society's mitigation, preparedness and emergency relief to mitigate and contain the impact of hazards on communities. This includes cascading and compounding events and impacts. These events have also revealed the difficulties associated with understanding and tackling hazard risk in a dynamic, interconnected and complex risk landscape.

Infrequent but potentially devastating tsunamis are a good example of this complexity. They are typically associated with other hazards such as earthquakes, liquefaction, and landslides that trigger the tsunami hazard and/or multiply the scale of impact. After the 2004 Indian Ocean Tsunami, there was huge investment in technical and human capacity building to better protect countries in the region from tsunami threats triggered by large submarine earthquakes. Sadly, these efforts proved insufficient when, in 2018, Indonesian communities faced two localised tsunami events that had very different characteristics from the country's recent experience.

Similarly, the COVID-19 pandemic exposed a wide range of underlying vulnerabilities in our society, and the consequences extended far beyond direct health impacts to disrupt economies and social lives in ways that would have been difficult for most people to conceive beforehand. While the immediate threat from COVID-19 might have eased, society must prepare for the next disruption, which may be very different. For example, the 2024 Microsoft Azure outage showed the far-reaching consequences of a single point of failure in cloud infrastructure, disrupting aviation, banking, healthcare and financial services around the world. What will the next major disruptive hazard event look like, and what concurrent challenges will society be facing that might increase its vulnerability?

These examples illustrate that to address such compound risks and complex emergencies, it will be essential to build broader societal resilience. There is a need to move from being reactive to being more proactive. The temptation is to reflect on past experiences as systemic risks are typically obvious in retrospect. But this complexity obscures their workings and inhibits extrapolation from the past to the future. Instead, there is a need to combine disciplinary knowledge, using models, counter-factual analysis and scenario building to sketch out the non-linear nature of systemic risks. It will also be necessary to embrace uncertainty and acknowledge that building resilience involves making timely decisions based on having good, but not perfect information, and instead focus on an improved understanding of the resilience capacity of communities, institutions, and systems.

INTRODUCTION TO KEYNOTE SPEAKER – III

Professor Ranjith Dissanayake

Professor Emeritus, University of Peradeniya
Founder, gapHQ
Colombo 07
Sri Lanka



Professor Ranjith Dissanayake is a distinguished academic, engineer, and sustainability leader. He serves as Professor Emeritus at the University of Peradeniya. With extensive leadership experience, he has held key positions including Immediate Past President of the Institution of Engineers, Sri Lanka (IESL), and Chairman of the Green Building Council of Sri Lanka (GBCSL).

An internationally recognised researcher, Professor Dissanayake is a Fulbright Scholar, Endeavour Fellow, and JASSO Research Fellow. His outstanding contributions have been honoured with prestigious accolades such as the ICE Overseas Prize, the Australia Alumni Excellence Award, and the Global Sustainability Lifetime Award 2024.

Beyond academia, he is a successful entrepreneur and founder of gapHQ, a headquarters for research commercialisation that leads multiple companies. His passion for sustainability drives his leadership in organizing global conferences on resource efficiency, biomimicry, and sustainable built environments. Professor Dissanayake continues to inspire innovation and excellence in engineering and sustainability worldwide.

ABSTRACT OF THE KEYNOTE ADDRESS – III

AIS Framework: Transforming Research into Sustainable Impact

Professor Ranjith Dissanayake

Professor Emeritus, University of Peradeniya

Founder, gapHQ, Colombo 07

Sri Lanka stands at a defining moment where research and innovation must move beyond traditional academic boundaries to create tangible societal value. The **AIS Framework** anchored on **Adaptation (A)**, **Innovation (I)**, and **Sustainability (S)** offers a strategic pathway to transform knowledge into sustainable impact and national development.

Adaptation (A) focuses on transforming global scientific advances into locally relevant solutions. Moving beyond conventional research, this approach promotes demand-driven applications directly responding to industrial needs and national priorities. By embedding researchers within industry and community contexts, academic work becomes a practical tool for solving real challenges.

Innovation (I) focuses on converting these adapted ideas into scalable, market-ready, socially impactful solutions. It extends beyond technology to include business models and governance mechanisms that accelerate implementation. Collaborative environments linking universities, industry, and government are essential to nurture prototypes and scale impact, as demonstrated by initiatives like Lanka AAC Pvt Ltd in Puttalam.

Sustainability (S) forms the foundation of the framework, ensuring that innovation balances environmental stewardship, social inclusion, and economic growth. Cleaner production, circular economy practices, and equitable access to innovation are core to achieving long-term resilience and national well-being.

Collectively, the AIS Framework transforms the traditional linear model of “research → development → innovation” into a **dynamic cycle of adaptation, innovation, and sustainable growth**. Each cycle generates new insights and priorities, sustaining continuous progress. In this process, universities evolve into central hubs within a national innovation ecosystem bridging knowledge creation, commercialisation, and policy development. By operationalizing the AIS Framework, Sri Lanka can harmonize global knowledge with local innovation, anchored by sustainability, to cultivate a resilient, knowledge-driven Sri Lanka prepared for future challenges. It transforms research from an academic pursuit into a catalyst for sustainable growth, social advancement, and national competitiveness.

LIST OF ABSTRACTS

Fragile peace in the face of catastrophe: Examining the immediate restraint and limitations of increasing militarisation in the Iran-Israel War of 2025 <i>M. S. Anees</i>	140
Assessing the contribution of wet zone home gardens to biodiversity conservation: A case study in Vilegoda GN Division, Kalutara, Sri Lanka <i>T. P. G. R. U. De Alvis</i>	141
Youth emigration, ageing, and middle-class dynamics: Shaping Sri Lanka's socioeconomic future <i>L. Dissanayake</i>	142
Smart devices, dumb decisions? The impact of over-automation on human thinking <i>L. I. De Fontaine</i>	143
Bridging tradition and tomorrow: Imagining the future of the Sri Lankan community Imam <i>N. Gafoordeen</i>	144
Household-level readiness towards digitalisation: Evidence from the Estate Sector in Sri Lanka <i>D. D. K. K. Gnanasena, S. V. D. Saputhanthri, D. D. P. M. Dunusinghe</i>	145
A comparison of the productivity of borrowings in written and spoken Sri Lankan English: A corpus-based study <i>S. R. Illangakoon</i>	146
Relationship between carbon emissions and economic growth in South Asian countries (1990-2023) <i>G. E. Kavirathna</i>	147
Spatiotemporal analysis of vegetation cover influence on land surface temperature in Gampaha DSD, Sri Lanka (2015-2025) <i>G. N. Kaushalya, V. P. I. S. Wijeratne</i>	148
Feasibility of achieving 70% renewable energy supply in Sri Lanka by 2030: A scenario analysis <i>N. A. J. Kithmini, A. N. Fernando, Y. K. N. Kandewatta, W. Wimalaratana, S. P. Premaratne</i>	149
Characteristics of seasonal rainfall in the Wet Zone of Sri Lanka during the standard climatological period 1991-2020 <i>G. L. Kodagoda, E. M. S. Ranasinghe</i>	150
Social structure, change, and interaction in communities surrounding the Seethawaka Export Processing Zone (SEPZ), Sri Lanka <i>K. A. A. Madhawa</i>	151

Portrayals of disability in traditional Sanni Yakuma rituals of Sri Lanka: A cultural analysis	
<i>M. A. D. Madushanka</i>	152
The impact of remote work on productivity in Sri Lanka's logistics and maritime sector	
<i>P. C. J. Nayanalochana, U. N. S. R. Perera, G. V. T. Kavindya</i>	153
Always present, never seen: Precarity and cleaning work in a Sri Lankan university	
<i>P. Peiris, W. A. I. Fernando, P. S. Shashikala, T. H. R. De Silva</i>	154
Barriers to Muslim youth representation in local governance: A case study of the Bulathsinhala Pradeshiya Sabha, Kalutara District, Sri Lanka	
<i>M. R. F. Raisa</i>	155
‘A Vision in Green’: An analysis of the relationship between environmental protection and Gross National Happiness in Bhutan	
<i>N. T. Ranasinghe</i>	156
Rainfall anomalies and their correlation with the El Niño Southern Oscillation in the Anuradhapura District, Sri Lanka	
<i>R. A. M. Ranasinghe, E. M. S. Ranasinghe, J. Gunatilake</i>	157
Challenges of urban tourism: A systematic review of impacts on sense of place and placemaking	
<i>N. Ranaweera, J. N. D. Jayathunga</i>	158
Geographical factors and their impact on the distribution of Islamic regions: A historical perspective	
<i>M. M. M. Sabir, S. Sawjanya</i>	159
Science and religion: Public and scientific understandings of evolution in pluralistic Sri Lanka	
<i>U. Samaraweera, S. Hettige, M. Mahees, A. Fernando, M. Premarathna, L. Hariharan</i>	160
Memorialisation and claims for justice in Japan’s Hiroshima-Nagasaki atomic bombings and Sri Lanka’s Mullivaikal Tamil victimhood	
<i>C. Shamini</i>	161
The role of the United Nations Environment Programme (UNEP) in enhancing environmental sustainability: With special reference to Indonesia	
<i>A. De Silva</i>	162
Learning English as a second language in school: Practices, issues, and challenges in Nuwara-Eliya Education Zone	
<i>M. Sushanthi, A. M. R. A. S. Bandara</i>	163
The Taste of Thirst: A sociological discourse on irregular women’s migration from Sri Lanka to Italy through the ‘Way of Marriage’	
<i>J. Wellawatte</i>	164
Intersectionality and queer experiences in “The Danish Girl” and “Boys Don’t Cry”	
<i>R. A. U. Yashodha</i>	165

Fragile peace in the face of catastrophe: Examining the immediate restraint and limitations of increasing militarisation in the Iran-Israel War of 2025

M. S. Anees

Department of Political Science and Public Policy, Faculty of Arts, University of Colombo, Sri Lanka

The short-lived conflict between Iran and Israel in 2025 is a clear illustration of the precarious equilibrium that controls the unstable Middle East. This paper examines how both sides' acute awareness of the disastrous consequences of further escalation was a key factor in the swift containment of these intense hostilities. Despite long-standing animosity and existential concerns, the conflict was kept from degenerating into a full-scale regional war by the recognition of mutually assured destruction, which placed a strategic ceiling on it. Both Israel and Iran showed restraint by moderating their military actions and avoiding proxy involvement, reflecting an awareness of the severe consequences unchecked escalation would have on their political regimes, infrastructures, and societies. A crucial fact is highlighted by this mutual prudence: although military force is still used as a tool of policy, it is fundamentally limited when dealing with existential conflicts that have the potential to cause irreversible human and geopolitical disaster. The study also examines how US involvement in crisis management, regional power dynamics, and tactical choices were influenced by this recognition of catastrophic escalation. It contends that the containment of the war revealed the profound fragility of peace maintained primarily through deterrence and fear of mutual destruction rather than resolving underlying tensions. In conclusion, this study argues that any lasting peace in the area necessitates addressing the existential fears that fuel conflict and moving beyond military rhetoric. The 2025 war's enduring fragility highlights the need for political solutions based on communication, fostering trust, and providing security assurances that lessen the need for force and prevent disastrous outcomes.

Keywords: *Fragile balance, Geopolitical catastrophe, Proxy activation, Regional power dynamics, Transcending military posturing*

Assessing the contribution of wet zone home gardens to biodiversity conservation: A case study in Vilegoda GN Division, Kalutara, Sri Lanka

T. P. G. R. U. De Alvis

Department of Geography, Faculty of Arts, University of Colombo, Sri Lanka

Home gardens in Sri Lanka, particularly in the wet zone, represent vital traditional agroforestry systems that significantly contribute to biodiversity. Within the lush landscapes of Sri Lanka's wet zone, a hidden tapestry of biodiversity thrives in traditional home gardens, serving as living libraries of plant species. This study, guided by the principles of the Agroecology Framework, views these gardens as complex, resilient ecosystems. It delves into their ecological richness, specifically within the Vilegoda GN Division of Kalutara, to assess their role in biodiversity conservation. The study used mixed methods and judgmental sampling of 30 home gardens to characterize agroforestry systems. Data collection involved primary data acquisition through direct observations and interviews. A rigorous quantitative analysis, utilizing Excel for descriptive statistics and crop composition visualisation via pie charts, alongside the calculation of the Shannon diversity index using SPSS to assess crop diversity levels, revealed a spectrum ranging from high to low diversity. A significant number of home gardens (40%) exhibited high diversity ($H > 2.0$), 50% of the gardens displayed moderate diversity ($1.8 < H < 2.0$), while 10% presented low diversity ($H < 1.8$), indicating either a limited number of species or a strong dominance by a few. Overall, the majority of surveyed home gardens exhibited moderate to high crop diversity, with perennial fruit cultivation dominating (47%), followed by vegetables (14%) and spices (12%), although some gardens displayed lower diversity, potentially increasing their vulnerability. In conclusion, the home gardens in Vilegoda are crucial for maintaining plant diversity and serve as important sites for biodiversity conservation. The findings underscore their ecological significance and highlight the importance of understanding and preserving these unique agroforestry systems.

Keywords: *Agroforestry, Biodiversity, Conservation, Home gardens, Kalutara*

Youth emigration, ageing, and middle-class dynamics: Shaping Sri Lanka's socioeconomic future

L. Dissanayake

Department of Demography, Faculty of Arts, University of Colombo, Sri Lanka

This paper explores how youth emigration, population ageing, and evolving middle-class dynamics are interlinked forces shaping Sri Lanka's socioeconomic future. Persistent outflows of skilled and educated youth, combined with declining fertility and an ageing population, are driving significant demographic changes that impact labour markets, social services, and economic growth prospects. Using population projections and household income data, the study examines the scale and characteristics of the emerging middle class, highlighting its role as both a product and driver of these demographic shifts. The paper discusses the opportunities middle-class expansion offers for sectors like education, healthcare, and the digital economy, alongside risks such as workforce shortages and urban inequality. Policy recommendations focus on talent retention, diaspora engagement, urban development, and education reform to harness these trends for sustainable and inclusive socioeconomic progress in Sri Lanka.

Keywords: *Ageing population, Middle-class dynamics, Population projections, Socioeconomic development Sri Lanka, Youth emigration*

Smart devices, dumb decisions? The impact of over-automation on human thinking

L. I. De Fontaine

Department of Information Technology, Faculty of Arts, University of Colombo, Sri Lanka

In today's fast-paced digital world, smart devices like smartphones, Global Positioning Systems (GPS) apps, and AI-powered assistants have become part of our everyday routines. They save us time, reduce effort, and often help us make quicker decisions. However, as we grow more dependent on these tools, we may be giving up something important – our ability to think for ourselves. This research explores how over-reliance on automation affects the way we remember, focus, solve problems, and make decisions. Drawing on recent findings in psychology and cognitive science, the study looks at how tools meant to help us may weaken mental skills when overused. This investigation relies on an examination of scholarly publications from 2015 to 2025, chosen for their connection to mental processes, user-technology interfaces, and studies of brain behaviour. It combines numerical data reviews with descriptive evaluations to assess patterns in brain function alterations linked to device dependency. For instance, using GPS too often can reduce our natural sense of direction, and relying on reminders or search engines might make it harder to remember things or think critically. Even having a phone nearby can distract us without our realising it. Evidence indicates that excessive device reliance can diminish recall precision by up to half in certain tasks, lower focus levels by around 10 units in assessments, and impair orientation abilities with moderate negative effects. However, intentional application of these tools supports individuals facing recall challenges and enhances efficiency in repetitive activities. On the other hand, smart devices can be incredibly helpful when used with intention. They can aid people with memory issues, improve safety in certain environments, and allow us to focus on more meaningful tasks when they take care of routine ones. The key finding of this study is that it is not the technology itself that is the problem; it is how we use it. When we hand over too much mental effort to machines without thinking, we risk becoming passive users instead of active thinkers. Finding a healthy balance between human thought and technological support is essential if we want to protect and strengthen our minds in an increasingly automated world.

Keywords: *Cognitive offloading, Decision-making, Human thinking, Automation, Smart technology*

Bridging tradition and tomorrow: Imagining the future of the Sri Lankan community Imam

N. Gafoordeen

Arabic and Islamic Civilisation Unit, Faculty of Arts, University of Colombo, Sri Lanka

The Imam, a central figure in Islamic communities worldwide, holds a particularly significant and nuanced position within the diverse socio-religious landscape of Sri Lanka. Far from being solely a prayer leader, the community Imam in Sri Lanka often serves as a spiritual guide, educator, social arbiter, and community developer. The major objective of the study is to comprehensively analyze the diverse roles and propose recommendations for enhancing the effectiveness and impact of Imams in contemporary society. The qualitative approach, relying on a synthesis of existing knowledge, observations, and an understanding of the socio-religious dynamics within Sri Lanka, was employed to address the research objectives. The analysis reveals that the community Imam in society performs a critical array of functions, often serving as the fundamental principle of community life. The following recommendations are proposed to establish a recognised institution to enhance the vital role of community Imams in Sri Lanka and maximize their positive impact on (a) Continuous professional development, (b) Formal recognition and support, (c) Empowerment in interfaith initiatives, (d) Integration with social services, (e) Youth engagement strategies, (f) Resource mobilisation and transparency and (g) Digital literacy and outreach. By recognizing their multifaceted contributions and providing them with enhanced training, resources, and support, Sri Lankan Muslim society can further empower these vital leaders to continue playing their crucial role in building resilient, harmonious, and progressive communities.

Keywords: *Community Imam, Empowerment, Leader, Society, Sri Lanka*

Household-level readiness towards digitalisation: Evidence from the Estate Sector in Sri Lanka

D. D. K. K. Gnanasena¹, S. V. D. Saputhanthri¹, D. D. P. M. Dunusinghe²

¹*Department of Information Technology, Faculty of Arts, University of Colombo, Sri Lanka*

²*Department of Economics, Faculty of Arts, University of Colombo, Sri Lanka*

Digitalisation is crucial in providing high-quality, efficient public services across various ethno-socio-economic groups. As per the 2025 budget speech, the government of Sri Lanka is in the process of promoting digitalisation in harnessing its potential. The success of the digitalisation drive will depend on many factors. Among them, the household-level ICT environment is critical. It is imperative to assess the readiness for digitalisation at the household level so as to identify necessary interventions for faster ICT adoption. This research aims to develop a composite index to measure the readiness towards digitalisation in the estate sector in Sri Lanka. By employing the cluster sampling technique, the study selected the Concordia estate in Nuwara Eliya for the field survey. Accordingly, a structured questionnaire was administered to 420 households. This study employed the composite index developed by the International Telecommunication Union (ITU) for measuring digitalisation readiness. This composite index measures digitalisation readiness through three dimensions, namely, access to existing ICT use and IT devices, usage of digital and web platforms for individual work, and IT skills and know-how. As per the data, the average index score is 0.38, while it ranges from 0.11 to 0.88, implying that the level of digitalisation readiness remains considerably low. Nevertheless, digitalisation readiness among young and middle-aged individuals remains relatively high compared to their counterparts in higher age groups. Moreover, educated individuals are more digitalisation oriented, where they often use the existing digital contents of the private and public sectors. E-governance facilities are limitedly used due to poor technical and human responses. In addition, e-payment facilities are often underutilised due to a lack of trust in product quality and delivery. The majority of individuals have not obtained any formal IT-related training, and therefore have limited digital self-defence. Evidence suggests that tailor-made interventions are required in promoting digitalisation in the estate communities.

Keywords: *Composite Index, Digitalisation, Estate Sector, Household-level, Sri Lanka*

A comparison of the productivity of borrowings in written and spoken Sri Lankan English: A corpus-based study

S. R. Illangakoon

Department of English Language Teaching, Faculty of Arts, University of Colombo, Sri Lanka

Sri Lankan English (SLE) is a variety derived from British English (BE) and influenced by local languages and contextual necessities. Similar to other World Englishes, SLE has shown variation from BE in vocabulary, pronunciation, and grammar. This study aims to investigate vocabulary through the productivity of borrowings; i.e., words copied from local languages and linguistically integrated into SLE. Borrowings are one of the features that showcase the unique adaptation and development of the language highlighting its Asian and local identity. This will be investigated through the occurrence of types of borrowings in the data. The data were taken from the Sri Lankan component of the International Corpus of English (ICE-SL), a collection of written and spoken texts, developed for research into World Englishes. The borrowings were divided into established borrowings (community accepted), mid-range borrowings (emerging), and nonce borrowings (emerging). Dispersion of borrowings is a new measure posited by this researcher to identify established borrowings. In the written and spoken genres, the established borrowings formed the smallest category (14% and 22% respectively), while nonce borrowings formed the largest (56% and 52% respectively). Nonce borrowings also showed the emergence of new grammatical features with borrowings. The possessive 's' used with borrowings in the written genre has been established and the current study posits the use of the possessive 's' in the spoken genre. Although the productivity of borrowings, as measured by type counts, is low (1.44% in writing and 0.01% in speech), the cultural and contextual needs, as well as the use of grammatical features with borrowings, indicate the acceptance of borrowings by SLE users. The study also noted over 1000 instances of codeswitching in speech, highlighting a significant difference between the genres of speech and writing.

Keywords: *Corpus study, Productivity, Sri Lankan English, Spoken genre, Written genre*

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Relationship between carbon emissions and economic growth in South Asian countries (1990-2023)

G. E. Kavirathna

Department of Geography, Faculty of Arts, University of Colombo, Sri Lanka

Carbon emissions, especially from diverse industrial activities and energy consumption, are the main causative factors of climate change and the disruption of environmental balance. The South Asian region is at the forefront of carbon emissions, as it includes developing nations. They are experiencing rapid population growth along with economic development contexts, which further intensify their carbon emissions footprint. Accordingly, this study aims to analyze the relationship between carbon emissions and economic growth in south Asian countries (1990-2023). To achieve the objective, data on annual CO₂ emissions and CO₂ emissions per capita have been collected from the “Our World in Data” source. Gross Domestic Product (GDP) and GDP per capita data were gathered from the “Macrotrends” data source. After the standardisation of those indicators, Pearson's linear correlation was utilised to analyze the relationship between carbon emissions and economic growth. According to the results, the relationship between annual carbon emissions and GDP has ranged between 0.92 and 0.99, which reveals a strong positive correlation since rapid industrialisation, high energy consumption, and tourism-based economic activities. Furthermore, the relationship between carbon emissions per capita and GDP per capita is illustrated as a positive correlation, with a range from 0.77 to 0.98. From this perspective, high automobile dependency, rapid urban sprawl, extensive fossil fuel consumption, and heavy tourism-related industrial activities are the main factors explaining this strong positive relationship. Thus, the carbon footprint in those countries is gradually increasing, and also the emerging future environmental challenges of economic activities. Hence, strategies such as using renewable energy sources, structured urban planning, introducing a sustainable tourism industry, and improving energy efficiency for low carbon emissions must be proposed to maintain environmental balance and ensure economic and environmental sustainability.

Keywords: *Carbon emissions, Economic growth, Relationship, South Asian countries*

Spatiotemporal analysis of vegetation cover influence on land surface temperature in Gampaha DSD, Sri Lanka (2015–2025)

G. N. Kaushalya¹, V. P. I. S. Wijeratne²

¹*Postgraduate Institute of Humanities and Social Sciences, University of Peradeniya, Sri Lanka*

²*Department of Geography, Faculty of Arts, University of Colombo, Sri Lanka*

Urbanisation significantly alters land surface characteristics, leading to vegetation loss and increased surface temperatures. This study investigates the spatiotemporal dynamics of vegetation cover and land surface temperature (LST) in the Gampaha Divisional Secretariat Division (DSD) in Sri Lanka, between 2015 and 2025. The research mainly aims to assess changes in the Normalised Difference Vegetation Index (NDVI) and Land Surface Temperature (LST). Further, it explores their interrelationship and identifies urban heat-affected zones. Landsat 8 and 9 satellite images were used to calculate NDVI and LST for the years 2015 and 2025. Spatial analyses, including Pearson correlation, scatter plots, and concentric ring buffers around Gampaha town were done to evaluate the spatial patterns and relationships between vegetation cover and surface temperature. The results indicate a general increase in NDVI values and slight vegetation recovery. However, urban areas like Gampaha, Yakkala, Miriswatta, and Kalagedihena exhibited noticeable vegetation loss. LST values showed a clear upward trend intensifying the urban heat island effect. A negative correlation between NDVI and LST was observed, with Pearson coefficients of -0.4308 in 2015 and -0.4823 in 2025. It highlighted the role of vegetation in surface cooling. The concentric ring analysis confirmed higher temperatures and lower NDVI values in central urban zones compared to other areas. These findings emphasize the critical role of green cover in moderating urban heat and underline the need for integrating vegetation-based strategies into urban planning. The study offers practical insights for policymakers to implement targeted green infrastructure in rapidly urbanizing areas. It also contributes to the broader understanding of urban climate dynamics in tropical regions.

Keywords: *Landsat, Land Surface Temperature, Normalised Difference Vegetation Index, Vegetation cover*

Feasibility of achieving 70% renewable energy supply in Sri Lanka by 2030: A scenario analysis

N. A. J. Kithmini¹, A. N. Fernando², Y. K. N. Kandewatta³, W. Wimalaratana²,
S. P. Premaratne²

¹*Centre for Poverty Analysis, Colombo 05, Sri Lanka*

²*Department of Economics, Faculty of Arts, University of Colombo, Sri Lanka*

³*Department of Economics, Faculty of Arts, University of Ruhuna, Sri Lanka*

Sri Lanka's energy sector is undergoing a significant transition aimed at strengthening energy supply security, reducing dependence on imported fossil fuels, lowering electricity costs, and mitigating greenhouse gas emissions. In 2024, renewable energy accounted for approximately 47% of total electricity generation, with the remainder largely reliant on imported coal and petroleum (Sri Lanka Sustainable Energy Authority, 2024). The national energy policy targets sourcing 70% of the country's electricity from renewable energy by 2030, aligning with Sustainable Development Goals (SDGs) 7 on affordable and clean energy and 13 on climate action. While ambitious, the target faces substantial technical, financial, and institutional challenges. Guided by energy transition theory, this study evaluates the feasibility of achieving the national energy-mix transition target using secondary data from the Ceylon Electricity Board, International Energy Agency, and Sri Lanka Sustainable Energy Authority. The analysis covers the period from 2010 to 2023 through a descriptive approach using scenario analysis to assess current energy mix, renewable capacity growth, demand trends, and fossil fuel dependency. The scenario modelling considers four pathways: baseline (business as usual), optimal (high renewable adoption with strong policy support), pessimistic (low renewable adoption due to barriers), and middle (moderate progress). Findings reveal that under the baseline scenario, the renewable energy share is projected to reach only 50% by 2030, well short of the target. The optimal scenario demonstrates technical feasibility if substantial investments in solar, wind, and grid modernisation are paired with stable policy frameworks. The pessimistic case highlights the risk of stagnation, while the middle case suggests a realistic possibility of 60–65% share with steady reforms. The study concludes that achieving the 70% renewable energy target is possible but requires decisive actions in capacity expansion, policy stability, financing mobilisation, demand-side management, and enhanced grid integration. Success or failure in this endeavor will influence not only Sri Lanka's domestic energy security but also its role as a regional model for small, import-dependent economies pursuing clean energy transitions.

Keywords: *Energy policy, Renewable energy transition, Scenario analysis, Sri Lanka, Sustainable Development Goals*

Characteristics of seasonal rainfall in the Wet Zone of Sri Lanka during the standard climatological period 1991-2020

G. L. Kodagoda, E. M. S. Ranasinghe

Department of Geography, Faculty of Arts, University of Colombo, Sri Lanka

This study focused on the seasonal rainfall pattern in the Wet Zone of Sri Lanka, as rainfall is the most significant weather and climate factor in the country. The literature review revealed a research gap: a lack of rainfall studies that focus on the agroecological regions of Sri Lanka incorporating the most recent standard climatological period, i.e. 1991-2020. Accordingly, two objectives were formulated: to identify the inter-annual variability of seasonal rainfall and to analyse the trends of seasonal rainfall in the Wet Zone. The coefficient of variance (CV) and the least-squares regression method were employed using SPSS and Excel software to fulfil the first and second objectives, respectively. The research was entirely based on the secondary data of 10 agroecological regions in the Wet Zone. The study found that the CV values for seasonal rainfall in the Wet Zone range from 19% to 65%. The Southwest Monsoon had the lowest variability (CV: 19%-27%), while the Northeast Monsoon had the highest (CV: 32%-65%). Statistically significant decreasing rainfall trends were observed in two regions: Kalutara during the Southwest Monsoon and Kenilworth during the Second Inter-Monsoon season. The rainfall trends in all other regions were not statistically significant across any of the four rainy seasons. The conclusion of the study confirms that monotonic trends were not found across the study area during the study period and were followed by statistically insignificant increasing and decreasing trends in most of the agroecological regions. However, with the exception of the Southwest Monsoon season, the other three seasons were accompanied by a higher inter-annual variability of rainfall. Finally, the study suggests that the results obtained in this research could be compared with data from the previous standard period (1961-1990) to investigate the validity of climate model predictions for the period 1991-2020. It would also inform future predictions of seasonal rainfall in the Wet Zone, thereby benefiting the development of policies for agriculture, water management, and resilience.

Keywords: *Inter-annual variability, Seasonal rainfall, Standard 30-year climatological period, Wet Zone*

Social structure, change, and interaction in communities surrounding the Seethawaka Export Processing Zone (SEPZ), Sri Lanka

K. A. A. Madhawa

Department of Sociology, Faculty of Arts, University of Colombo, Sri Lanka

The Seethawaka Export Processing Zone (SEPZ), established in 1999 in Avissawella, has emerged as a major site of industrial development with over 20,000 employees. While its economic contributions are widely acknowledged, its sociological implications remain underexplored. This study, grounded in sociological theories of social structure, social change, and social interaction, examines how the SEPZ has reshaped community life in adjacent villages. Drawing on Giddens' Structuration Theory and modernisation perspectives, the research highlights the dynamic relationship between industrial expansion and local society. A qualitative case study was conducted in Halhotawatta, where ten participants were selected through purposive and snowball sampling to ensure diversity and access to hard-to-reach voices. Data collection methods included semi-structured interviews, direct observation, and short questionnaires, and thematic analysis was used in the study. Findings reveal multidimensional impacts. In terms of social structure, SEPZ-related employment expanded opportunities for youth and women, reconfigured household economies, and fostered new livelihood patterns such as rental housing and food vending. Processes of social change included rapid urbanisation, weakening of traditional community bonds, and heightened exposure to environmental risks such as air and water pollution, which contributed to respiratory illnesses and declining wellbeing. Patterns of social interaction shifted as migrant inflows generated both cooperation (through trade and labour exchange) and tensions (linked to cultural differences, drug use, and crime). A striking outcome is the absence of structured engagement between SEPZ authorities and residents, leading to mistrust and exclusion from decision-making. The study concludes that the SEPZ is simultaneously a driver of economic progress and a source of contested social transformation. It argues for integrating community voices, enforcing environmental safeguards, and institutionalizing Social Impact Assessments (SIAs) to ensure that industrial growth contributes to sustainable and inclusive development.

Keywords: *Community development, SEPZ, Social change, Social interaction, Social structure*

Portrayals of disability in traditional Sanni Yakuma rituals of Sri Lanka: A cultural analysis

M. A. D. Madushanka

Department of Sociology, Faculty of Arts, University of Colombo, Sri Lanka

The *Sanni Yakuma*, a ritual healing performance in Sri Lanka's traditional *yakadura* (exorcism) practice, features a series of masks and characters, each representing a particular illness or affliction. Among these, several *Sanni* embody physical, sensory, and cognitive disabilities. This study examines how such disabilities are portrayed within the *Sanni* tradition and the cultural meanings attached to these depictions, situating them within the broader context of Sri Lankan beliefs about illness, misfortune, and the supernatural. This research is based on secondary data collected from existing ethnographic studies and scholarly analyses of the *Sanni Yakuma*. Thematic content analysis was conducted focusing on mask design, symbolic gestures, and narrative roles. Prominent disability-related *sanni* include: *Andha Sanniya* (blindness, depicted with closed or hollow eyes), *Kana Sanniya* (partial blindness, with one eye exaggerated), *Golu Sanniya* (mute or speech-impaired, shown with sealed lips or exaggerated mouth), *Butha Sanniya* (mental illness or disorientation, with asymmetrical facial features), and *Pissu Sanniya* (madness, represented through erratic gestures). These portrayals use visual exaggeration, posture, and movement to signify impairments, raising questions about whether they reinforce stigmatizing views or act as symbolic elements in a healing ritual. Humour, fear, and empathy often intersect in shaping audience responses. The findings suggest that while the *Sanni Yakuma* traditionally conceptualised disability as a manifestation of demonic influence requiring ritual intervention, it also served as a communal space for engaging with difference and misfortune. These portrayals simultaneously preserve a form of intangible heritage and risk perpetuating stereotypes about disability. Understanding these dual roles is essential for appreciating the cultural complexity of the *Sanni Yakuma* and for considering its place within contemporary conversations on disability and heritage preservation in Sri Lanka.

Keywords: *Disability, Mask art, Sanni Yakuma, Stereotypes*

The impact of remote work on productivity in Sri Lanka's logistics and maritime sector

P. C. J. Nayanalochana¹, U. N. S. R. Perera¹, G. V. T. Kavindya²

¹*Department of Economics, Faculty of Arts, University of Colombo, Sri Lanka*

²*Independent Researcher*

This study investigates the impact of remote work on employee productivity in Sri Lanka's logistics and maritime sector, focusing on administrative, logistics management, and customer service roles at the Port of Colombo. While remote work has been extensively studied in knowledge-based sectors like IT, its effect on productivity in the maritime industry remains underexplored. Using an Ordinary Least Squares (OLS) multiple regression model, the research examines how work-life balance, communication effectiveness, work flexibility, and the physical work environment influence productivity in remote settings. The sample comprises 100 employees engaged in remote roles at Colombo Port, selected through purposive sampling. Data were collected via a structured questionnaire, measuring both independent variables and employee productivity using self-reported indicators such as task efficiency and job satisfaction. The regression analysis reveals that work-life balance, effective communication, and work flexibility all significantly contribute to productivity, with work-life balance showing the strongest effect, increasing productivity by 27%. Communication practices, with a coefficient of 0.220, also significantly enhance productivity by reducing errors and improving coordination in logistics and maritime operations. Work flexibility increases productivity by 23%, enabling employees to better manage personal and professional responsibilities. However, the physical work environment has a minimal, non-significant effect (12%) on productivity, highlighting that process efficiency and coordination are more critical in this sector. Demographic factors such as gender, age, experience, and salary also influence productivity, with female employees facing additional challenges due to domestic responsibilities. Age positively impacts productivity, especially for employees aged 26-35, whereas older employees over 36, often in management roles, experience a decline in productivity due to remote work challenges. The study concludes that understanding these factors is crucial for optimising remote work policies and addressing sector-specific challenges in Sri Lanka's maritime industry.

Keywords: *Remote working, Employee productivity, Maritime sector, Work-life balance, Logistics management*

Always present, never seen: Precarity and cleaning work in a Sri Lankan university

P. Peiris¹, W. A. I. Fernando², P. S. Shashikala¹, T. H. R. De Silva¹

¹*Department of Political Science and Public Policy, Faculty of Arts, University of Colombo, Sri Lanka*

²*Social Scientists' Association, Colombo 07, Sri Lanka*

This study examines the political economy of precarious cleaning labour within the University of Colombo, Sri Lanka. Drawing on our long-term observations as faculty members and on qualitative research with cleaners, supervisors, academic staff, students, and community members, the paper situates the lived experiences of these workers within broader neoliberal transformations in Sri Lanka's labour regime. The cleaners—many beyond retirement age, physically and mentally unfit for the strenuous work they perform—labour under hazardous conditions. They lack basic protective equipment, clean toilets without proper footwear, and handle waste barehanded. Paid only for days worked, without medical leave or insurance, they often continue working despite illness to finance medication. Most come from economically devastated neighbourhoods, marked by drug abuse, crime, and extreme poverty. Interestingly, despite their daily presence, these workers remain socially invisible to much of the university community, with their continued exploitation rationalised as “benevolent” employment. Analytically, the paper engages with neoliberal political economy, Foucault's governmentality, and Achille Mbembe's necropolitics to explore how the state's long retreat from welfare responsibilities—intensified since the structural adjustment era—has enabled forms of labour control that commodify marginalised bodies. In a context of economic crisis and disaster capitalism, these workers' bodies are acknowledged, yet rendered into calculable units of value under neoliberal ethics of “honest work,” productivity, and individual responsibility. The study reveals how precarity is normalised within a premier public university—an institution ostensibly committed to critical thought—highlighting the contradictions of intellectual spaces that overlook the exploitation embedded in their everyday operations.

Keywords: *Precarious labour, Neoliberal governmentality, Cleaning workers*

Barriers to Muslim youth representation in local governance: A case study of the Bulathsinhala Pradeshiya Sabha, Kalutara District, Sri Lanka

M. R. F. Raisa

Department of Political Science, Faculty of Arts, University of Colombo, Sri Lanka

Despite Sri Lanka's long history of multi-ethnic coexistence, Muslim youth remain severely underrepresented in local governance, particularly outside the Northern and Eastern provinces. This study focuses on the Bulathsinhala Pradeshiya Sabha in Kalutara District, where no Muslim youth has been elected for over two decades. Drawing on Youth Political Participation Theory (YPPT), the research analyzes how structural, institutional, and socio-cultural barriers intersect to limit minority youth engagement. A mixed-methods design was employed, combining a survey of 50 Muslim residents, semi-structured interviews with 12 key informants, and the analysis of secondary sources, including election results and legal frameworks. Findings reveal that economic marginalisation restricts campaign capacity; political parties' selection processes and institutional practices limit access; low Sinhala proficiency and weak political literacy hinder civic engagement; cultural norms linking leadership maturity to age 40 discourage youth below 40 from contesting elections; and divisions within the Muslim community reduce mobilisation. These overlapping barriers illustrate how inadequate resources, restrictive opportunity structures, and cultural constraints converge to exclude Muslim youth from representation. The study recommends introducing youth quotas with provisions for minority inclusion, enhancing bilingual education in line with government policy, providing political literacy and mentorship programmes, and fostering community awareness to challenge cultural perceptions that inhibit youth leadership. Addressing these barriers is crucial to promoting equitable and inclusive governance in Sri Lanka.

Keywords: *Local governance, Minority inclusion, Muslim youth, Political representation, Youth Political Participation Theory*

‘A Vision in Green’: An analysis of the relationship between environmental protection and Gross National Happiness in Bhutan

N. T. Ranasinghe

Department of International Relations, Faculty of Arts, University of Colombo, Sri Lanka

Bhutan has paved the way for Human-Environment-Centric policies that contribute to Gross National Happiness (GNH). According to GNH Centre Bhutan (2025), the quality of development is measured by balancing material and spiritual growth. The purpose of this study is to assess the connection between environmental protection and GNH in Bhutan. Thereby, the research objective is to examine the contribution of environmental protection to GNH. Consequently, the research question is, how does environmental protection contribute to GNH? The study relied on qualitative secondary sources as well as the Human Needs Theory by Abraham Maslow, where he suggests different layers of needs that are interconnected and should be fulfilled for a person to reach fulfilment in life. Chung (1969) mentions these needs as physiological, safety, social, self-respect, and self-actualisation. Additionally, Human Development, Human Security, Human Rights, and Sustainable Development have also been included. The results showcase that the Bhutanese rely heavily on the environment and their basic needs, which include physiological needs such as food, water, and clean air, and safety needs such as security of employment, family, and availability of resources can only be obtained by conserving the environment. This eventually connects with their other needs such as belongingness and love needs and esteem needs which are focused on mutual relationships and connections. Subsequently, they can achieve freedom from want, fear, and indignity and eventually boosting stability, and a sense of accomplishment and are able to have the life they desire. This research also noted how environmental security can affect other aspects of Human Security and ultimately Human Development. In conclusion, this research suggests that enhancing this connection and molding it into development policies can be one of the solutions for climate change, and also mental well-being.

Keywords: *Gross National Happiness, Environmental protection, Sustainable Development, Human Development, Human Security*

Rainfall anomalies and their correlation with the El Niño Southern Oscillation in the Anuradhapura District, Sri Lanka

R. A. M. Ranasinghe¹, E. M. S. Ranasinghe¹, J. Gunatilake²

¹*Department of Geography, Faculty of Arts, University of Colombo, Sri Lanka*

²*Postgraduate Institute of Science, University of Peradeniya, Sri Lanka*

The El-Niño Southern Oscillation (ENSO) is a major climate driver in South Asia, and its two phases, El-Niño and La-Niña, have a crucial impact on rainfall patterns. While some ENSO studies have been conducted in Sri Lanka, a significant research gap exists: most available data is limited up to the year 2010. Furthermore, there is a lack of micro-level studies on specific, agriculturally vital areas. This study aims to fill this gap by focusing on the Anuradhapura District. The objective of this research was to explore rainfall anomalies and analyse their correlation with El-Niño and La-Niña events in the Anuradhapura district from 1961 to 2020. The research relied entirely on secondary data from the Department of Meteorology Sri Lanka, and the Bureau of Meteorology, Australia. The Standardised Precipitation Index (SPI) was used to analyse rainfall anomalies, classifying above-average rainfall as wet conditions and below-average rainfall as dry. Of 22 recorded El-Niño events, 13 (59.1%) coincided with wet conditions, predominantly in October and November. Their severity was categorised as extreme (46%), very wet (23%), and moderately wet (31%). Conversely, only four El-Niño events aligned with moderate dry conditions in January, March, and September. Of 21 La-Niña events, 48% correlated with dry conditions, mainly in October and November. The severity of these dry periods was 10% extreme, 40% severe, and 50% moderate. Wet conditions occurred in 29% of La Niña events, with extreme, severe, and moderate categories equally represented, primarily in March, April, July, and August. By combining the robust analytical method of the SPI with the context of ENSO events, this study provides a detailed and localised understanding of the climate drivers behind rainfall anomalies in Anuradhapura, which is vital for developing effective strategies to mitigate the impacts of floods and droughts on its agricultural economy.

Keywords: *Anuradhapura District, El Niño Southern Oscillation, Rainfall anomalies, Standardised Precipitation Index*

Challenges of urban tourism: A systematic review of impacts on sense of place and placemaking

N. Ranaweera¹, J. N. D. Jayathunga²

¹*Global Disaster Resilience Centre, Applied Science School, University of Huddersfield, UK*

²*Department of Geography, Faculty of Arts, University of Colombo, Sri Lanka*

Urban tourism is a growing sector globally that offers several economic and social advantages. Regrettably, the growing trend of urban tourism has created several effects on urban living across various contexts, presenting numerous challenges for sustainable urban development. Placemaking is a concept focused on developing enjoyable, vibrant, and versatile environments for people, primarily encompassing tourism activities and public spaces. However, the concept of placemaking has also faced challenges due to the current trends in urban tourism, negatively affecting the sense of place. Sustainable places cannot be developed or maintained without fostering a sense of place and honouring place relationships. Therefore, this study addresses the subject of urban tourism and its impact on the sense of place and the placemaking concept. The objective of this research is to critically review and identify the challenges of urban tourism that impact the sense of place and placemaking, to provide effective recommendations to address the concerns connected with urban tourism while simultaneously restoring the sense of place for enhanced urban living quality. To comprehend the whole context, the research conducts a systematic literature review following the PRISMA systematic research protocol. This is an ongoing literature review and initial abstract screening of 37 papers, which has been completed. After the initial abstract screening step, the examination of 24 full-text studies is presently in progress, revealing some preliminary descriptive coding. Identified challenges through descriptive coding include spatial reconfiguration, housing market pressures, resident displacement, lack of regulations, insufficient infrastructure, overtourism, a sense of exclusivity, degradation of local identity, and political conflicts. It is expected to provide findings relevant to the challenges of urban tourism, sense of place, and placemaking, and those findings will be synthesised, leading to recommendations for reducing the challenges of urban tourism. Consequently, this review expects to provide significant findings for the research domain of sustainable urban tourism development, sense of place, and placemaking contributing to global sustainable urban development.

Keywords: *Place making, Sense of place, Sustainable urban development, Urban tourism*

Geographical factors and their impact on the distribution of Islamic regions: A historical perspective

M. M. M. Sabir¹, S. Sawjanya²

¹*Arabic and Islamic Civilisation Unit, Faculty of Arts, University of Colombo, Sri Lanka*

²*Department of Geography, South Eastern University of Sri Lanka*

The distribution of Islamic regions since the seventh century is one of the most significant processes in world history, encompassing the spread of the religion, sociopolitical state-building, and cultural integration across the continent. Although most of the literature has focused on the political and military aspects of the Islamic expansion, the geographical and ecological aspects have not been thoroughly explored. This paper examines the role of geographical location, water resources, climate, and trade routes in shaping the distribution, sustainability, and stability of Islamic territories. The objectives are: (1) to test ecological and historical factors influencing regional development, (2) to analyze terrain and trade routes as supports for expansion and stability, and (3) to evaluate the contribution of Islamic ecological ethics, especially *mizan* (balance), *khalifa* (stewardship), and *israf* (waste avoidance), to the development of resilient societies. The methodology employed is a qualitative and historical-geographical approach, utilizing descriptive content analysis. The primary sources include the Quran and passages of Hadith that address land stewardship, while secondary sources comprise scholarly articles, journals, and historical chronicles. The case studies focus on Baghdad, Mecca, Córdoba, Tunis, Cairo, and Timbuktu—cities chosen for their ecological diversity, political importance, and cultural significance. Results indicate that geography, water supply, and trade routes played crucial roles in shaping the growth and prosperity of regional centres, alongside political and military factors. The Silk Road, Indian Ocean routes, and Trans-Saharan caravans contributed to the movement of products, religion, and culture, significantly influencing the geographic distribution of Islamic expansion. The availability of water, climate-adaptive urban planning, and ecological ethics enabled cities to become hubs of learning, trade, and worship. The research concludes that the spread of Islam was not solely driven by conquest, but rather resulted from a combination of human activities, religious principles, and environmental factors. The tenets of *mizan*, *khalifa*, and *israf* for modern development can provide valuable lessons on ecological resilience and sustainable urban planning. Understanding these historical processes enhances insights into adaptation, cultural sustainability, and environmental governance in Muslim-majority regions, as well as in other areas.

Keywords: *Baghdad, Geography, Islamic expansion, Trade routes, Urban resilience*

Science and religion: Public and scientific understandings of evolution in pluralistic Sri Lanka

U. Samaraweera, S. Hettige, M. Mahees, A. Fernando, M. Premarathna, L. Hariharan

Department of Sociology, Faculty of Arts, University of Colombo, Sri Lanka

This study explores the complex relationship between religion and science in pluralistic Sri Lanka, focusing on public and scientific understandings of evolution. Based on 60 semi-structured interviews and 10 focus group discussions across five provinces, alongside a comprehensive literature review, the research reveals how religious identity, early socialisation, and contextual factors such as ethno-religious diversity and education shape perceptions of evolutionary science. Participants included 22 life scientists and 38 members of the public, reflecting the religious and linguistic spectrum of Sri Lankan society comprising Buddhists, Hindus, Muslims, and Christians. The research was conducted in accordance with ethical standards, including the procurement of informed consent and the assurance of participant anonymity. Findings show that while life scientists generally demonstrate a sound understanding of evolution, the general public holds a wide range of interpretations from metaphorical to symbolic, often shaped by religious worldviews. Many participants attempted to reconcile evolution with their beliefs, suggesting a negotiation rather than open conflict. However, a significant number of individuals expressed contradictions between private acceptance and public silence, revealing tensions in directing these domains. The study also highlights key structural barriers: limited resources in schools, linguistic segregation, and lack of exposure to science education especially in rural and marginalised communities. These conditions restrict the public's understanding of evolutionary theory. Importantly, discussions of evolution are notably absent from mainstream media and public discourse in Sri Lanka. The influence of religious authorities such as priests, monks, and imams and the figures of Gods and deities play a critical role in shaping how evolution is framed. For many, belief in God or respect for religious leaders took precedence over scientific explanations, contributing to a "God versus scientist" tension, although not always in antagonistic ways. Yet, Sri Lanka's religiously plural and relatively tolerant society often enables coexistence of diverse beliefs, even in the absence of open debate. This research calls for inclusive, culturally sensitive science education and public engagement that respect religious diversity while promoting scientific literacy. It contributes to global conversations on religion and science by offering insights from a deeply religious, postcolonial society where public narratives on evolution remain largely unexplored.

Keywords: *Science, Religion, Evolution, Pluralism, Education*

Memorialisation and claims for justice in Japan's Hiroshima-Nagasaki atomic bombings and Sri Lanka's Mullivaikal Tamil victimhood

C. Shamini

Department of Political Science and Public Policy, Faculty of Arts, University of Colombo, Sri Lanka

This research analyzes memorialisation and justice-claiming regarding two primary civilian atrocities of the 20th and 21st centuries: the Hiroshima and Nagasaki atomic bombings in 1945 and the Mullivaikal massacre near the conclusion of Sri Lanka's civil war in 2009. Both catastrophes, occurring within distinct socio-historical contexts, resulted in unprecedented civilian death tolls and accompanying socio-political consequences, which show varying reactions by the respective concerned states and survivor communities. The Hiroshima-Nagasaki survivor witness has been remembered by and large as a 'world peace symbol,' with disarmament and survival most prominent, while state-sponsored histories put most emphasis on nuclear non-proliferation and reconciliation through treaty models (Hasegawa, 2019). Conversely, the Mullivaikal Tamil victim narrative features contested memory, state-led denial of Tamil experience, diaspora-led memorialisation, and ongoing legal action to seek accountability for alleged war crimes and genocide (Amnesty International, 2023; Tamil Guardian, 2024). Employing qualitative approaches, this study investigates memorialisation practices, survivor justice claims, and international law pertaining to both contexts. The findings of the study demonstrate how variations in political systems, relations of power, and international legal constraints deeply impact the construction of collective memory and justice strategies. Survivors in Hiroshima-Nagasaki prioritize peace activism over punishment of offenders, while Mullivaikal survivors continually seek legal justice in the face of state denial. The research highlights the need for contextualised theories in transitional justice and memorialisation discussions, illustrating how political realities influence victims' pursuit of healing and justice.

Keywords: *Accountability, Memorialisation, Offender punishment, Transitional justice, War crimes*

The role of the United Nations Environment Programme (UNEP) in enhancing environmental sustainability: With special reference to Indonesia

A. De Silva

Department of International Relations, Faculty of Arts, University of Colombo, Sri Lanka

The United Nations Environment Programme (UNEP) has emerged as the leading global authority addressing environmental governance and climate action, notably under the framework of the Sustainable Development Goals (SDGs), particularly Goal 13 on Climate Action. This research investigates UNEP's role in advancing environmental sustainability, mainly focusing on Indonesia, a country confronting significant environmental challenges. Employing a qualitative methodology, this research analyses secondary data sources to provide an in-depth understanding of UNEP's role. The study intends to adopt Green Theory as the key theoretical framework and analytical method, mainly emphasises three principles, ecocentrism, limits to growth, and decentralisation. These principles are used to critically evaluate UNEP's environmental policies and actions within the Indonesian context. Through this analytical lens, the study assesses the extent to which UNEP has addressed the complex challenges associated with environmental sustainability in Indonesia. Findings reveal that UNEP's role extends beyond agenda-setting to active legal and policy support through its Legal Division, which assists in shaping Indonesia's environmental legislation and operationalising the 2030 Agenda for environmental sustainability. The decentralisation concept, grounded in Green Theory, is evident as UNEP's global environmental mandates are localised in Indonesia's governance structures. UNEP's influence is notably reflected in Indonesia's adoption of sustainable environment policies and participation in initiatives like the Green Customs Program, facilitating enhanced climate change mitigation and environmental governance capacity. In conclusion, this study highlights the importance of global-local linkages in achieving sustainable development and underscores UNEP's pivotal role in addressing complex environmental challenges through legal, policy, and governance mechanisms. However, in some cases, addressing environmental issues with the national interest and domestic policies of states may clash. For instance, Indonesia was the fourth largest emitter of greenhouse gases in the world in 2015, mainly due to their economic policies. Therefore, strengthening UNEP's role and legal authority is crucial for effective global-local environmental sustainability and institutional capacity, legal frameworks, and multi-sector cooperation.

Keywords: *Climate change, Environmental sustainability, Green Theory, Sustainable Development Goals (SDGs), United Nation Environment Programme (UNEP)*

Learning English as a second language in school: Practices, issues, and challenges in Nuwara-Eliya Education Zone

M. Sushanthi, A. M. R. A. S. Bandara

Department of Sociology, Faculty of Arts, University of Colombo, Sri Lanka

The emergence of English as a global language has brought many changes to the ways in which this language is perceived and used. With a rapidly evolving globalised landscape, proficiency in English is essential for professionals across diverse industries. This study embarks on how schoolteachers utilise educational tools, pedagogical methods, and content knowledge to optimise English learning skill acquisition, and focuses on challenges faced by learners in learning English as a second language. This study aims to provide insights into the adaptation of pedagogical practices to meet the evolving needs of learners. Adopting a mixed-methods research approach, the study draws on both quantitative and qualitative data collected from a purposive sample of 50 participants, including 30 teachers and 20 students. Data collection involved the administration of pre-tests and post-tests for teachers, questionnaires, and semi-structured interviews. A series of structured skill share sessions was conducted with teachers over ten days to promote the implementation of learner-centred educational practices and to enhance pedagogical effectiveness. Quantitative data were analysed using IBM SPSS software, while qualitative data were examined through thematic analysis. The findings highlight several critical insights. Although the use of innovative pedagogical methods and digital tools contribute positively to English language learning, substantial challenges persist. These include insufficient physical resources, limited access to English learning opportunities, and a lack of comprehensive teacher training in adaptive and socio-economic barriers. Additionally, many classrooms continue to operate under traditional teacher-centred models, limiting student engagement and language use. The study concludes emphasising the need for increased investment in teacher professional development, the provision of adequate instructional resources, and the adoption of learner-centred pedagogical frameworks. Addressing these areas is essential for improving English language learning outcomes and aligning instructional practices with the demands of the current situation.

Keywords: *Content knowledge, Education practices, English communication skills, Learning challenges, Pedagogical knowledge*

The Taste of Thirst: A sociological discourse on irregular women's migration from Sri Lanka to Italy through the 'Way of Marriage'

J. Wellawatte

Department of Sociology, Faculty of Arts, University of Colombo, Sri Lanka

This article explores the sociological dynamics of irregular women's migration from Sri Lanka to Italy via deceptive, marriage-based strategies. The core research question asks: How do Sri Lankans use marriage as a tool for irregular migration to Italy, and what challenges do they face in settlement and adaptation? The study seeks to understand the motivations behind choosing this high-risk path and examines the role of brokers and informal networks that sustain it. Italy was chosen as the focal site because it has historically been one of the most prominent destinations for Sri Lankan women migrating through marriage pathways, shaped by Catholic networks, pilgrimage connections, and the long-standing presence of Sri Lankan communities in Italy. Using purposive sampling, the research draws on in-depth interviews with 20 undocumented Sri Lankan migrants living in Rome, Milan, and Naples. From this group, three female respondents and one male respondent were selected for detailed case studies. The analysis is informed by Pierre Bourdieu's theory of social capital, especially the concepts of taste, habitus, and symbolic capital; Jean Baudrillard's notions of simulation and hyperreality; and Julia O'Connell Davidson's theory of symbolic coercion. These frameworks reveal how fantasies of modernity, emotional scarcity, and symbolic mobility shape migrant decisions and performances. The article challenges simplified narratives of trafficking and irregular migration by showing how marriage operates as both a performative act and a strategic survival tool. It blurs the boundaries between consent and coercion, romance and transaction. The concept of "thirst"—a term used by the migrants themselves—encapsulates the gendered, affective, and symbolic intensity of their pursuit of a better life. By examining the interplay of illusion, survival, and strategy, the study contributes to broader debates on irregular migration, gendered desire, and the moral ambiguities of legality and legitimacy.

Keywords: *Gendered desire, Hyperreality, Marriage migration, Symbolic capital, Symbolic coercion*

Intersectionality and queer experiences in “The Danish Girl” and “Boys Don’t Cry”

R. A. U. Yashodha

Department of English Language Teaching, Faculty of Arts, University of Colombo, Sri Lanka

This study employs queer theory alongside intersectionality frameworks to comparatively analyze transgender representations in *The Danish Girl* (2015) and *Boys Don’t Cry* (1999), addressing a critical issue that has received insufficient attention. The concern focuses on social attributes such as class, geography, and historical context, examined within gendered and queer frameworks, moving beyond an identity-centric approach. The approach to researching the subject combines the films' narrative and stylistic aspects through comparative textual analysis with semi-structured interviews conducted with trans-identified individuals and film scholars. The methodology's range enables both a close reading and critiques that are authentic and impact-centered. The films demonstrate Judith Butler’s theory of gender performativity; however, the intersectional factors largely determine the way in which that theory applies. *The Danish Girl* illustrates how Lili Elbe, an upper-class trans woman in 1920s Copenhagen, is able to medically and artistically transition through the privileges of then-accessible upper-class social and medical customs and community. *Boys Don’t Cry*, in contrast, highlights the violence inflicted on Brandon Teena as a trans man, resulting from his working-class status and the rural, conservative context of 1990s Nebraska, compounded by other vulnerabilities. The contrast showcases the privileges and marginalisation stratified through intersectional social factors.

Keywords: *Gender identity, Sexuality, Intersectionality, Queer experience, Social change*

FACULTY OF SCIENCE



Science for Human-Centric Innovation and Resilience

7th November 2025

MESSAGE FROM THE DEAN

Professor Upul Sonnadara

*Chair Professor of Physics
Faculty of Science, University of Colombo
Sri Lanka*



I am pleased to extend my sincere congratulations to the staff and students on the occasion of the Annual Research Symposium of the University of Colombo and the Technical Sessions of the Faculty of Science, scheduled for November 7, 2025.

The theme for this year's faculty research session, 'Science for Human-Centric Innovation and Resilience' highlights the emphasis that the Faculty of Science places on research and innovation. Our academics and postgraduate students continue to generate knowledge in diverse fields of science that are both nationally and globally relevant. Research spanning across seven disciplines of study leads to a considerable number of publications annually in high-ranking local and international journals and conferences. Our research has also led to many innovations and solutions to industry problems, contributing to the development of locally applicable products and practices. Recently, we have taken a few important policy decisions to monitor the effectiveness and timely completion of our postgraduate programs, one of which is the establishment of the Centre for Postgraduate Studies (CPGS).

Over 500 postgraduate students are currently enrolled in master's and research degree programs offered by the faculty. While focusing on research, we have also aimed to produce postgraduates distinguished by their professionalism, commitment to learning, and their ability to undertake independent research work. I am proud to say that we have positioned ourselves to produce the highest number of PhD-qualified graduates among all science faculties in the country.

The postgraduate research sessions provide an ideal platform for knowledge-sharing. I am confident that this will prove to be highly productive for all of us. I wish all those involved in the Annual Research Symposium the very best.

MESSAGE FROM THE SYMPOSIUM CO-CHAIRS



Professor S. S. N. Perera

*Department of Mathematics
Faculty of Science
University of Colombo, Sri Lanka*



Professor C. D. Tilakaratne

*Department of Statistics
Faculty of Science
University of Colombo, Sri Lanka*

The Center for Postgraduate Studies (CPGS) of the Faculty of Science, in collaboration with the seven departments of the faculty, is organizing the Postgraduate Technical Sessions for the third consecutive year. The Postgraduate Technical Sessions 2025 will be held on 7th November at the faculty premises, under the theme ‘*Science for Human-Centric Innovation and Resilience*’. This event is part of the Annual Research Symposium 2025 of the University of Colombo.

The highlights of the event include a keynote speech by Professor Saman Senaweera, a prominent scientist and the immediate past Chairman of the National Science Foundation of Sri Lanka. There will also be presentations by two young academics of the faculty on the topic ‘*AI Applications for Science Research*’, along with postgraduate research presentations across four tracks: Physics, Mathematical Sciences & Nuclear Science, Chemistry, and Biological Sciences. A total of 31 postgraduate research abstracts will be presented across these four tracks.

We wish all the best to the presenters who contribute to this event by sharing their valuable knowledge.

ORGANIZING COMMITTEE

The Annual Research Symposium (Postgraduate Technical Sessions) 2025 of the Faculty of Science is organized by the Centre of Postgraduate Studies (CPGS).

Advisor	Prof. Upul Sonnadara (Dean, Faculty of Science)
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PROGRAMME OF THE POSTGRADUATE TECHNICAL SESSIONS

8.00 am – 8.30 am	Registration of Participants
8.30 am – 8.35 am	Lighting of the Traditional Oil Lamp
8.35 am – 8.40 am	National Anthem
8.40 am – 8.45 am	Welcome Address <i>Prof. Sanjeewa Perea, Symposium Co-chair</i>
8.45 am – 9.15 am	Keynote Address <i>Prof. Saman Senaweera</i> <i>Honorary Professor, University of Melbourne, Australia</i>
9.15 am – 9.55 am	Presentations by young academics of the faculty <i>Dr. Kalpani Marasinghe & Dr. Muditha Bandara</i>
9.55 am – 10.00 am	Vote of Thanks
10.00 am – 10.30 am	Refreshments
10.30 am – 1.00 pm	Postgraduate Technical Sessions Track 1 – Physics Track 2 – Mathematics, Statistics & Nuclear Science Track 3 – Chemistry Track 4 – Biological Science (Each track includes a Guest Lecture from 10.30 am – 11.00 am followed by presentations by PG Students/Academic staff members)
1.00 pm – 2.00 pm	Lunch

INTRODUCTION TO THE KEYNOTE SPEAKER

Professor Saman Seneweera

*Honorary Professor
University of Melbourne
Australia*



Professor Saman Seneweera is an internationally recognised expert in climate change biology. He was the Chair Professor of Agricultural Engineering and Environmental Technology at the University of Ruhuna, Professor at the National Institute of Fundamental Studies in Kandy, and Professor at the University of Southern Queensland (USQ), Australia. Currently, he is an Honorary Professor at the University of Melbourne, Australia. Professor Seneweera started his academic career with a Bachelor's degree in Agriculture. He pursued his doctoral studies at the University of Western Sydney, Australia, specialising in plant physiology, in particular plant carbon and nitrogen metabolism. He has held esteemed academic and research positions at leading institutions worldwide, including the University of Melbourne, University of Southern Queensland, Tohoku University (Japan), and the University of Illinois (USA). He has also provided leadership to various institutions, including serving as Director of the National Institute of Fundamental Studies, Sri Lanka, Chairman of the National Science Foundation of Sri Lanka, and Acting CEO of the Sri Lankan Nanotechnology Institute, Leader of the Plant Biology programme at USQ, Australia and Head of the FACE research programme, University of Melbourne.

His tenure as Director and CEO of the National Institute of Fundamental Studies significantly elevated the institute's standing. Under his leadership, NIFS improved its global academic rankings, launched commercialisation initiatives, and greatly expanded its postgraduate programmes. As Chairman of the National Science Foundation of Sri Lanka, Professor Seneweera provided visionary leadership to the country's national scientific agenda. He is a prolific researcher with over 250 peer-reviewed journal articles and book chapters, including publications in prestigious journals such as *Nature* and *Science*. His work has garnered nearly 9,000 citations with an h-index of 51. He has consistently been ranked among the top 2% of scientists worldwide by Stanford University for last seven years.

ABSTRACT OF THE KEYNOTE ADDRESS

Biofortification of Cereals: Unlocking the Genetic Pathways to Achieve the Global Zinc Malnutrition

Professor Saman Seneweera

*School of Agriculture, Food and Ecosystem Sciences, Faculty of Science
The University of Melbourne, Royal Parade, Parkville, Victoria 3010, Australia*

Zinc (Zn) deficiency remains one of the most significant global public health challenges, affecting nearly 17% of the world's population, with a particularly high prevalence in South Asia. On other hand, wheat (*Triticum aestivum* L.) and rice (*Oryza Sativa* L.) are the most widely consumed cereal and a main source of dietary calories, protein and mineral including Zinc (Zn) in Asia. Yet, the inherent low zinc and high phytic acid content in the wheat and rice endosperm, and the binding of Zn to anti-nutritional factors such as phytic acid significantly limit its bioavailability. Genetic biofortification through targeted breeding and molecular interventions has therefore emerged as a promising and sustainable approach to enhance grain Zn concentrations and thus improve human nutrition.

This keynote presentation will synthesise current knowledge and our research findings on the physiological, molecular, and genetic mechanisms that regulate Zn uptake, translocation, and deposition in wheat grain. It will first highlight the processes of Zn acquisition at the root-soil interface, where uptake is facilitated by Zn-regulated transporters (ZIP), yellow-stripe-like transporters (YSL), and chelators such as nicotianamine and deoxymugineic acid. Despite these well-orchestrated mechanisms, bottlenecks persist during the transport of Zn to the shoot and its redistribution to developing grains. Synchrotron-based imaging studies reveal that the majority of Zn accumulates in the aleurone and embryo, while the starchy endosperm; the primary constituent of flour, remains Zn-deficient. We identified this restricted redistribution is partly attributed to anatomical barriers in the crease region and the complexation of Zn with phytic acid, which limits its bioavailability.

Advances in breeding and biotechnology offer pathways to overcome these challenges. Screening of more than 6,000 wheat accessions has revealed wide genetic variability for grain Zn concentration, ranging from 12 to 117 mg kg⁻¹, with wild relatives such as both in rice and wheat providing valuable alleles for enrichment. The functional allele of the NAM-B1 gene, for example, enhances nutrient remobilisation from senescing tissues, simultaneously increasing grain Zn, Fe, and protein. Quantitative trait loci (QTLs) linked to Zn accumulation, particularly on chromosomes 3D, 4B, 6B, and 7A, account for a large share of genetic variation in wheat, suggesting the potential of marker-assisted selection. Complementary to conventional breeding, molecular engineering has successfully enhanced Zn levels in other cereals, with the overexpression of genes such as *NAS*, *HMA*, and *ferritin* improving both Zn transport and

endosperm loading. Emerging genome-editing platforms, such as CRISPR/Cas9, now present unprecedented opportunities to manipulate Zn transporters, reduce phytic acid synthesis, and develop non-transgenic, consumer-acceptable biofortified cultivars.

The keynote will also critically address the translational challenges of deploying genetically biofortified wheat and rice. These include the need to balance Zn enrichment with agronomic performance, the uncertainties surrounding genetic environment interactions that influence Zn accumulation, and the social and regulatory hurdles associated with genetically modified crops. Importantly, enhancing Zn content in wheat not only holds promise for combating hidden hunger but also contributes to achieving multiple Sustainable Development Goals (SDGs), particularly those addressing food security, health, and sustainable agriculture.

In summary, genetic biofortification of wheat and rice represents a transformative, cost-effective, and environmentally friendly solution to address Zn malnutrition. In order, we need to close the gaps in our knowledge on Zn transport and bioavailability, use genetic diversity, and use new molecular tools in combination with breeding strategies. This research examines the complex biology of Zn loading into grain, providing a means to develop nutritionally enhanced wheat cultivars that can improve global health outcomes while preserving crop yields.

LIST OF ABSTRACTS

TRACK 1: PHYSICS

- Transforming ChatGPT for human-like interaction in Physics Education: A case study using content and language integrated learning with GCE A/L students**
H. L. W. P. Guruge, M. S. Gunawardene, R. V. Coorey 179
- Investigating the suitability of Gestalt Principles for enhancing conceptual understanding of Newton's Laws among year 10 Physics students: A case study**
H. Balasubramaniam, M. S. Gunawardene, R. V. Coorey 180
- Probing the hidden nature of the universe by high energy physics simulations of Big Bang nucleosynthesis and AGN**
P. A. Liyanage, J. Adassuriya, K. P. S. C. Jayaratne, M. B. Rathnayake 181
- Induced effect on the solar panel due to Narrow Bipolar Pulses**
G. Lokuhettige, S. Nanayakkara, M. Fernando, V. Cooray 182
- Simulation and optical design of a compact high-resolution spectrograph using Zemax OpticStudio**
M. Viveganandam, J. Adassuriya, K. P. S. C. Jayaratne 183
- Evaluating satellite-derived salinity indices for surface water salinity estimation using *in-situ* electrical conductivity measurements in Kalu Ganga**
E. G. K. R. Egodage, J. T. Kalani, H. H. E. Jayaweera, M. S. Gunewardena, J. K. D. S. Jayanetti, W. A. M. Madhavi 184
- Classification of pre-harvest avocado maturity using machine learning assisted polarization-based multispectral imaging**
M. Perera, K. A. D. M. Chandupa, S. De Silva, M. Madhavi, S. Gunewardene, H. Jayaweera 185

TRACK 2: MATHEMATICS, STATISTICS & NUCLEAR SCIENCE

- A multi-criteria framework for locating sustainable wind energy plants in Sri Lanka**
A. W. S. Hansika, K. K. W. H. Erandi, S. S. N. Perera 186
- Topological index-based filtering to identify suitable nanocarriers for Amoxicillin: A graph theoretical approach**
W. T. L. D. Thathsarani, K. K. W. H. Erandi, U. P. Liyanage, S. S. N. Perera, P. Paranamana 187
- A comparative analysis to forecast carbon dioxide emission in Sri Lanka**
K. D. Madhubhashani, R. A. B. Abeygunawardana 188
- A hybrid modelling approach for forecasting fluvial flood occurrences in the Ratnapura area, Sri Lanka**
K. S. Saubhagya, C. D. Tilakaratne, G. P. Lakraj, M. A. Mammadov 189

Spatial-temporal analysis of the Colombo flight information region	
<i>P. K. A. D. N. H. Thilakarathne, C. D. Tilakaratne</i>	190
Factors associated with chronic kidney disease of unknown aetiology in Sri Lanka	
<i>M. P. P. U. Chulasiri, R. V. R. V. Jayatillake</i>	191
A preliminary measurement and analysis of the altitudinal variation of beryllium-7 and other atmospheric isotopes in Colombo, Sri Lanka	
<i>D. M. S. R. Alwis, M. R. Lamabadusuriya, J. S. Wickremasinghe, C. Sumithrarachchi</i>	192
A feasibility study of the production of ¹³¹I to be used in radioimmunoassay in Sri Lanka	
<i>M. Perera, R. Thenabadu, M. Lamabadusuriya, C. Sumithrarachchi</i>	193
TRACK 3: CHEMISTRY	
Suppression of lipid accumulation by water-extracts of red mold rice through down-regulation of PPARγ and C/EBPα transcription factors	
<i>I. P. Wanninaika, M. N. Kaumal, C. Hettiarachchi</i>	194
Exploring the potential of tea polyphenols to reduce citrinin production during black tea fermentation with <i>Monascus purpureus</i>	
<i>P. Subasinghe, M. N. Kaumal, U. P. S. Hasara, G. Abewickrama, C. Hettiarachchi</i>	195
Improving the properties of asphalt binder 60/70 by incorporating naphthalene-containing mineral oil derived from petroleum by-products	
<i>W. S. U. S. Wijenayaka, S. M. Vithanarachchi</i>	196
Synthesis of ZnO nanoparticles using plant extracts containing saponins and investigation of their antibacterial activity	
<i>A. N. Wagarachchi, S. M. Vithanarachchi</i>	197
Immunofluorescence based characterization of Dengue Non-Structural Protein 1 (NS1) intracellular localization in hepatic and non-hepatic cells	
<i>K. Sirisena, K. J. Wijesinghe</i>	198
Evaluation of heavy metal removal potential of <i>Terminalia catappa</i> leaves using biosorption	
<i>K. A. Y. Umayanganee, G. N. Silva, D. P. N. De Silva</i>	199
Breaking the cytokine storm: An <i>in-silico</i> study of bamboo shoot sterols as natural TNF-α brakes in severe Dengue	
<i>K. A. L. H. Gunathilaka, W. M. C. Sameera, G. N. Silva, N. I. Abeyasinghe</i>	200
A need analysis of Sri Lanka's secondary education practices: Identifying required reforms for authentic teaching and learning to address skills mismatch	
<i>B. M. Hewa Siliyange, L. S. I. Liyanage, T. P. Rupasinghe, N. de Silva, A. Tillekaratne</i>	201

TRACK 4: BIOLOGICAL SCIENCE

Evaluation of the performance of network-based protein function prediction algorithms on protein-protein interaction networks in plants

M. A. S. U. Piyatissa, T. L. S. Tirimanne, S. P. C. Fernando 202

Adaptive responses of stomatal characteristics of mangroves to diverse salinity levels

R. Krishanthiny, H. I. U. Caldera, T. Mathiventhan, K. G. S. U. Ariyawansa 203

Microbiological quality of spices from Small & Medium-Scale Enterprises (SMEs) in Sri Lanka

G. Thamira, C. M. Nanayakkara, U. Rajawardana, D. Jayawardana 204

Plant Growth-Promoting Potential of Endophytic Fungi (PGPEF) isolated from *Avicennia marina* in enhancing growth parameters of chili plants

K. Thushanthan, T. Mathiventhan, H. I. U. Caldera, N. N. Wijayawardene, K. G. S. U. Ariyawansa 205

Understanding the trace element landscape of Sri Lankan rice: Distribution and correlational patterns of toxic heavy metals and essential elements

J. W. Gunawardana, S. A. Gunawardena, C. Witharana, N. D. A. Wageesha, I. C. Perera 206

Dynamics of blue carbon in mangroves in the Rekawa Lagoon, Sri Lanka: Integrating remote sensing and the InVEST model for coastal ecosystem management

W. K. Suwandhahannadi, D. Wickramasinghe, D. D. G. L. Dahanayaka, L. Le De 207

Understanding elephant crop raiding behaviour: Interrelations with land use patterns, crop characteristics, and social structure of male elephants

C. Fernando, D. Weerakoon, S. Pilapitiya, M. R. Wijesinghe, P. Fernando 208

Valuing Nature's Treasure: An integrated conservation valuation of the Muthurajawela Wetland, Sri Lanka

H. Dahanayake, D. D. G. L. Dahanayaka, P. Hudson, D. Wickramasinghe 209

TRACK 1: PHYSICS

Transforming ChatGPT for human-like interaction in Physics Education: A case study using content and language integrated learning with GCE A/L students

H. L. W. P. Guruge¹, M. S. Gunawardene², R. V. Coorey²

¹*Sacred Heart Convent, Galle, Sri Lanka*

²*Department of Physics, Faculty of Science, University of Colombo, Sri Lanka*

This study investigates the transformative potential of ChatGPT when reconfigured to support human-like interaction in physics education. Moving beyond its conventional use for providing direct answers, ChatGPT was adapted to engage students in reflective, question-driven dialogue, encouraging metacognitive development and conceptual understanding. The intervention focused on 32 female GCE A/L physics students and was grounded in student-centered learning, Vygotsky's Zone of Proximal Development, and principles of Content and Language Integrated Learning (CLIL). Students worked in collaborative groups and participated in hands-on experiments involving oscillatory motion in springs and pendulums. These experiences formed the basis for AI-guided discussions where students refined mathematical models of simple harmonic motion. Digital tools such as PhET simulations, GeoGebra, Desmos, and Data Lab enhanced visual reasoning and supported conceptual exploration. ChatGPT's instructional scaffolding was personalized and gradually reduced as students exhibited increased independence in problem-solving. The intervention progressed from experimental observations to modeling wave phenomena and the Doppler Effect. In the second phase, students' ability to construct and explain physical models independently was assessed. Pre- and post-tests using the Physics Inventory of Quantitative Literacy (PIQL) were administered, and a Wilcoxon Signed-Rank test indicated a statistically significant improvement in performance, with mean scores rising from 25% to 58% ($p < 0.001$). Gains were especially notable in proportional and co-variational reasoning and in interpreting signed quantities. Qualitative analysis of AI logs and peer discussions revealed a shift from vague or purely grammatical responses to semantically rich, scientifically accurate explanations. ChatGPT's affirming prompts fostered student confidence and encouraged the use of appropriate scientific vocabulary. Overall, the findings suggest that a humanized AI, when embedded in a constructivist, CLIL-based framework, can act as a scalable instructional partner. Such integration holds promise for enhancing learning in resource-limited and large-class environments by promoting deeper engagement, critical thinking, and autonomous learning in physics education.

Keywords: *AI in education, ChatGPT, Content and Language Integrated learning (CLIL), Constructivist learning, Vygotsky's zone of proximal development (ZPD)*

Investigating the suitability of Gestalt Principles for enhancing conceptual understanding of Newton's Laws among year 10 Physics students: A case study

H. Balasubramaniam¹, M. S. Gunawardene², R. V. Coorey²

¹ *Colombo International School, Sri Lanka*

² *Department of Physics, Faculty of Science, University of Colombo, Sri Lanka*

Newton's Laws of Motion are central to understanding physical interactions, yet students often struggle to develop a clear conceptual grasp, particularly of Newton's Third Law. Common misconceptions include the belief that larger objects exert greater forces and that action–reaction forces do not occur simultaneously. Traditional instruction, with its emphasis on mathematical problem-solving, often reinforces these difficulties. This study investigated the use of Gestalt principles—such as proximity, continuity, and symmetry—as a pedagogical tool to improve students' interpretation of force diagrams. The intervention involved 30 grade ten students in an international school, identified through diagnostic testing as holding common misconceptions. Lessons explicitly integrated Gestalt principles into the construction and analysis of force diagrams to promote holistic visualization of Newton's Laws. A mixed-methods approach was adopted. Quantitative data were obtained from pre- and post-tests using a standardized conceptual assessment, while qualitative data were derived from students' written explanations, classroom observations, and analyses of their force diagrams. Test scores showed a modest improvement (mean rising from 6.40 to 6.80), though this was not statistically significant, likely due to the small sample size. In contrast, qualitative findings revealed notable conceptual progress: 70% of students produced more accurate force diagrams, 40% improved in identifying action–reaction pairs, and many reported Gestalt-based visuals as more intuitive than traditional diagrams. Challenges remained with complex scenarios, indicating that visual strategies alone cannot fully resolve entrenched misconceptions. The study concludes that Gestalt principles provide a valuable framework for enhancing visualization and engagement in physics education. Their effectiveness is maximized when combined with other instructional strategies, such as conceptual scaffolding, interactive learning, and guided reasoning, to support deeper understanding of Newtonian mechanics.

Keywords: *Newton's Laws, Conceptual understanding, Gestalt Principles, Physics Education, Force diagrams*

Probing the hidden nature of the universe by high energy physics simulations of Big Bang nucleosynthesis and AGN

P. A. Liyanage¹, J. Adassuriya², K. P. S. C. Jayaratne², M. B. Rathnayake¹

¹*Department of Nuclear Science, Faculty of Science, University of Colombo, Sri Lanka*

²*Department of Physics, Faculty of Science, University of Colombo, Sri Lanka*

A major challenge in cosmology and astrophysics is explaining the origin of elements. The study focuses on identifying nucleosynthesis in the early universe using the Geant4 simulation toolkit, specifically Hadron Physics package, to model nuclear processes fundamental to Big Bang Nucleosynthesis (BBN). Alpha particles colliding with Galactic material initiated nucleosynthesis, producing new particles subsequently incorporated into the surrounding medium. Successive interactions with additional alpha particles advanced further synthesis. The research identifies the nuclear reactions involved in the synthesis of all elements, along with their initiation energy, initiation temperature, and Q-values. The investigation found elements up to $Z=238$ in nucleosynthesis. Furthermore, it can be concluded that initiation energy and temperature increase nearly linear with the atomic number, up to $Z=108$ and transitioning to exponential growth beyond $Z=108$ up to $Z=238$, explaining the current elemental limit at $Z=118$. Notably, nuclear synthesis reactions exhibit negative Q-values, indicating they are endothermic. The presence of negative Q-value nuclear synthesis aligns with the energy-absorbing nature of black holes and suggests a novel mechanism for the generation of elements in these extreme zones. Furthermore, the study proposes that relativistic jets could carry signatures of newly formed elements synthesized in such energetic environments, aligning with temperatures. This provides new insight into the astrophysical role of black holes in cosmic element formation. This suggests that the energy and temperature patterns observed in these nuclear reactions are quite similar to what scientists believe happened during the Big Bang, providing a possible explanation for the role of negative Q-value reactions in initiating it. The study discusses how energy-to-matter conversion contributes to universal expansion, while matter-to-energy conversion underpins compression, linking Q-values to cosmological dynamics. These insights provide a novel interpretation of the Universe's evolution through phases of Inflation, Expansion, Steady State, Compression, and eventual Collapse, governed by the thermodynamics of nuclear synthesis.

Keywords: *Nucleosynthesis, Relativistic Jets, AGN, Energy-Matter Transformation, Physics of the Cosmos*

Induced effect on the solar panel due to Narrow Bipolar Pulses

G. Lokuhettige¹, S. Nanayakkara², M. Fernando¹, V. Cooray³

¹*Department of Physics, Faculty of Science, University of Colombo, Sri Lanka*

²*NitroCapt, Uppsala, Sweden*

³*Department of Electrical Engineering, Uppsala University, Sweden*

With growing concerns about the environment due to the use of fossil fuels, the adoption of green energy is gaining popularity worldwide. Solar power is the major green energy source in Sri Lanka. Solar photovoltaic (PV) systems are being damaged due to direct and indirect lightning strikes. This study aimed to investigate the lightning-induced effect on solar PV systems due to Narrow Bipolar Pulses (NBPs). The experimental setup consists of a solar panel and a microinverter mounted on the rooftop of the Department of Physics at the University of Colombo, Sri Lanka (6.9024° N, 79.8607° E). We measured the simultaneous common-mode DC⁺ terminal induced voltage and current through the DC⁺ terminal with the vertical electric field signatures of the NBPs. Among the recorded eighty-three pulses, seven were identified as Negative Narrow Bipolar Pulses (NNBPs). Analysis was conducted with those seven files. A burst of pulses has been induced on solar panels at NNBPs, while the simultaneously induced current was negligible. The highest peak-to-peak voltage of 1.44 V was induced at NNBP amplitude of 11.07 V/m. The mean value of the peak to-peak induced voltage was (0.98±0.10) V, whereas the standard deviation was 0.26 V. The respective mean value and the standard deviation of the induced voltage pulse duration were (32.85±1.93) µs and 5.09 µs. Although the peak amplitude variation of the NNBPs and the DC⁺ terminal induced voltage shows a moderate positive correlation, further analysis of more pulses is required to determine the exact relationship between the two parameters. Gaining knowledge of the waveshape, amplitude, pulse duration and other statistical parameters of the lightning-induced voltage and current is important in designing protection for solar PV systems. Hence, further investigations are needed to verify our experimental findings and reveal more details of the induced effect on solar panels due to NBPs.

Keywords: *Induced effect, Lightning, Narrow Bipolar Pulses, Protection, Solar panel*

Acknowledgements: We acknowledge First Energy SL (Pvt) Ltd for providing solar panels and inverters.

Simulation and optical design of a compact high-resolution spectrograph using Zemax OpticStudio

M. Viveganandam, J. Adassuriya, K. P. S. C. Jayaratne

*Astronomy and Space Science Unit, Department of Physics, Faculty of Science,
University of Colombo, Sri Lanka*

This research focuses on the optical design and simulation of a high-resolution spectrograph. Spectrographs are extremely useful in astronomy. By analyzing the spectrum, we can determine the physical and chemical composition of celestial bodies for various research purposes. Astronomical spectrographs are typically mounted at the eyepiece of the telescope. However, Cassegrain telescopes with Alt-Azimuth mounts, which are comparatively inexpensive and widely used by astronomers, do not allow a commercially available spectrograph to be mounted at the eyepiece due to the limited gap between the telescope and the mount. Therefore, a new compact high resolution spectrograph is designed which can be coupled directly to these types of telescopes. The overall resolving power of a spectrograph is a key parameter of astronomical observations. Therefore, we focused on maximizing the resolving power and introduced concave lens in between the slit and the collimator, which increases the optical beam incident on the diffraction grating. The optical design and simulations were conducted using a widely used optical modeling tool, Zemax OpticStudio. The main objective of this design is to determine and validate the performance and measurements required for the physical construction of the spectrograph to achieve maximum resolution. Essential components such as the entrance slit, collimating and focusing lenses, diffraction grating, and spacing between components were precisely calculated. These calculated values were then compared with simulation results to verify their accuracy and performance. Validation was performed through spot diagram analysis. The system demonstrated distinct wavelength separation for 400 nm, 550 nm, and 700 nm with minimal vertical spread, indicating accurate slit imaging and good focus across the visible spectrum.

Keywords: *Spectrograph, Alt-Azimuth mount, Optical design, Zemax OpticStudio, Astronomy instrumentation*

Acknowledgements: We acknowledge financial support from the University of Colombo (University Research Grant No: AP/3/2/2024/SG/28).

Evaluating satellite-derived salinity indices for surface water salinity estimation using *in-situ* electrical conductivity measurements in Kalu Ganga

E. G. K. R. Egodage¹, J. T. Kalani¹, H. H. E. Jayaweera¹, M. S. Gunewardena¹,
J. K. D. S. Jayanetti², W. A. M. Madhavi¹

¹*Department of Physics, Faculty of Science, University of Colombo, Sri Lanka*

²*Department of Instrumentation and Automation Technology, Faculty of Technology,
University of Colombo, Sri Lanka*

Water salinity is a crucial environmental parameter that influences ecosystem health, water quality, agriculture, and irrigation, with saline water reducing crop productivity and threatening food security. Measurement of water electrical conductivity (EC), either from samples or *in situ*, is the most widely accepted method for estimating salinity. However, measuring electrical conductivity using samples or *in situ* over a large field is a tedious and expensive process. Several studies have been conducted to relate satellite-derived indices with ground truth values to overcome these challenges. A submersible proximity sensor with data logging capability was deployed to EC along a 15.5 km stretch of Kalu Ganga over a period of six months. Four different salinity indices NDWI1, NDWI2, NDWI3, and NDVI derived from Landsat 8 satellite imagery were used to develop a linear regression model relating satellite-derived indices and ground-measured EC. Cross-validation confirmed that the linear model performed best compared to the 2nd order, or the 3rd order polynomial models. The NDWI3 spectral index showed the highest positive correlation (0.811) with EC. The regression model yielded an acceptable performance with an RMSE of 0.0819, R² of 0.6584, and an MAE of 0.0679 with $p < 0.001$. Adopting non-linear regression models is expected to further improve the performance of the model.

Keywords: *Spatial-Temporal, Salinity, Electrical Conductivity (EC), Salinity Index, Landsat*

Classification of pre-harvest avocado maturity using machine learning assisted polarization-based multispectral imaging

M. Perera, K. A. D. M. Chandupa, S. De Silva, M. Madhavi, S. Gunewardene, H. Jayaweera

Department of Physics, Faculty of Science, University of Colombo, Sri Lanka

Avocado (*Persea americana*) is a climacteric fruit with significant commercial value. This study reports the development of a multispectral imaging system based on the degree of linear polarization (MSI-DoLP) to estimate the physiological maturity level of avocados *in situ*. The MSI-DoLP employs three light-emitting diodes with center emission wavelengths at 450 nm, 520 nm, and 630 nm. A mobile phone camera served as the imaging device, and two linear polarizers were used to capture DoLP images. A rotating sample holder facilitated imaging of multiple locations of the fruit. The objective was to detect the pre-harvest maturity of an avocado. A cross-sectional study design was used for the experiment. MSI-DoLP was performed on both mature and immature avocados during plucking. Samples were obtained from several locations of the central province of Sri Lanka consisting of more than 600 DoLP multispectral measurements on 100 different avocado samples. Partial Least Square Discriminant Analysis (PLS-DA), Random Forests, and Support Vector Machines (SVM) were used for the classification. The 630 nm spectral window showed the best sensitivity and selectivity for correctly identifying a mature fruit at the time of harvesting. SVM-based classification recorded the overall best accuracy (82%).

Keywords: *Multispectral imaging, Food quality, Preharvest Technology, Linear polarization, Machine Learning*

TRACK 2: MATHEMATICS, STATISTICS & NUCLEAR SCIENCE

A multi-criteria framework for locating sustainable wind energy plants in Sri Lanka

A. W. S. Hansika, K. K. W. H. Erandi, S. S. N. Perera

*Centre for Mathematical Modelling, Department of Mathematics, Faculty of Science,
University of Colombo, Sri Lanka*

In the modern world, renewable energy is considered the newest trend in the field of energy generation. Currently, increasing energy demand and rising energy costs are identified as major issues in the world, including in Sri Lanka. Renewable energy resources are seen as an impactful solution because of their availability, economic viability, and environmental friendliness. This study focuses on identifying the most significant locations for wind power generation in Sri Lanka by integrating environmental, technical, and economic considerations. Thirty regions across the country were selected for the analysis. Data were gathered from NASA POWER Access Viewer, Google Earth Pro, and QGIS. Five decision factors that are responsible for the sustainability of wind plants were considered in this study, namely, wind density, elevation, land use, distance from restricted areas, and proximity to road networks. Fast Fourier Transform was applied to assess wind density patterns, which revealed seasonal consistency in several regions, including Trincomalee, Hambantota, Kalmunai and Mannar. Fuzzy Analytic Hierarchy Process (FAHP) and the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) were applied to evaluate regional suitability, by incorporating expert judgment and literature-based criteria. The results were refined using clustering analysis, and cities were grouped based on overall suitability scores. The regions were categorized into different suitability levels based on the TOPSIS criteria, and among them, Kalmunai and Mannar were identified as the most significant locations for setting up wind energy plants, while the other areas were observed to have low potential. The importance of maintaining updated data and applying advanced methods is emphasized to improve the accuracy and reliability of wind energy planning. The approach of this study can be used to improve decision-making in the development of wind power systems in Sri Lanka.

Keywords: *Renewable energy, Wind power, Fast Fourier Transform, Fuzzy logic*

Topological index-based filtering to identify suitable nanocarriers for Amoxicillin: a graph theoretical approach

W. T. L. D. Thathsarani¹, K. K. W. H. Erandi¹, U. P. Liyanage¹, S. S. N. Perera¹,
P. Paranamana²

¹*Centre for Mathematical Modeling, Department of Mathematics, Faculty of Science,
University of Colombo, Sri Lanka*

²*Saint Mary's College, Norte Dame, Indiana, USA*

Dendrimers are well-defined, hyperbranched nanocarriers with significant potential in antibiotic delivery systems. This study applies graph-theoretical analysis to identify topological indices of four dendrimer classes Poly (amidoamine) (PAMAM), Poly (propylene imine) (PPI), Polyester, and Hybrid, when loaded with Amoxicillin. Two drug-loading strategies are considered; covalent surface attachment and internal encapsulation. Each dendrimer is modelled across three generations: Generation 1 (G1), Generation 2 (G2), and Generation 3 (G3), with molecular structures represented as graphs. Each successive generation introduces a new layer of branching units extending from the terminal groups of the previous generation. The study focuses on minimizing the filtering process required during experimental screening, to reduce the cost and complexity of drug design. To predict the dendrimer-based nanocarriers more efficiently, these structures are quantitatively assessed using topological indices, including the Wiener, Zagreb, Schultz, Randić, Harary, Balaban, and Kappa indices. A generation-wise comparison shows that increasing dendrimer generations enhances topological indices such as Wiener and Schultz, indicating improved branching and drug-holding capacity. However, higher generations may reduce flexibility and compromise biocompatibility. Among the structures tested, G2 emerges as the optimal configuration for the PAMAM, PPI, and Polyester dendrimers, with a medium-chain length preferred for Polyester. For Hybrid dendrimers, the most effective system is a combination of PAMAM-G2 with a medium-chain Polyester, offering a balance of encapsulation volume and structural stability. The results indicate that PPI-G2 with covalently bonded Amoxicillin shows high stability and controlled release, supported by strong Schultz and Randić index values. In the case of the Hybrid dendrimer with encapsulated Amoxicillin, the structure displays excellent topological balance, with high Harary and Wiener indices indicating compactness and diffusion, and moderate Kappa indices reflecting flexibility. These findings confirm the utility of topological indices as predictive tools for evaluating nanocarrier structures and highlight the suitability of specific dendrimer architectures for efficient antibiotic delivery.

Keywords: *Topological indices, Dendrimers, Amoxicillin delivery, Chemical graph theory, Nanocarriers*

A comparative analysis to forecast carbon dioxide emission in Sri Lanka

K. D. Madhubhashani, R. A. B. Abeygunawardana

Department of Statistics, Faculty of Science, University of Colombo, Sri Lanka

Most of the blame for the warming or change in climate is believed to be due to the increased concentration of the gaseous substance carbon dioxide (CO₂) in our atmosphere. This study aims to forecast annual CO₂ emissions in Sri Lanka, considering socioeconomic and energy related factors. Secondary data from the World Bank Open Data Source were utilized, including annual CO₂ emissions, total population, Gross Domestic Product (GDP) per capita, electricity production from oil, gas and coal sources, energy use and CO₂ intensity per energy consumption in Sri Lanka from 1971 - 2014. The dataset was split into a training period from 1971–2004 for model fitting and a testing period from 2005–2014 for out of sample validation. Among the explanatory variables, only the population data was log-transformed to stabilize variance and linearize its relationship with CO₂ emissions, as it exhibited exponential growth over time. The ARIMA model was developed using only CO₂ emissions data, while the ARIMAX model incorporated exogenous variables. Several model selection criteria such as Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), Root Mean Square Error (RMSE) and Mean Absolute Percentage Error (MAPE) were applied to determine the best fitting models. The stationarity test was conducted using the Augmented Dickey-Fuller (ADF) test and the Kwiatkowski Phillips Schmidt Shin test (KPSS) which confirmed the non-stationary nature of the CO₂ series, and exhibited a strong upward trend without seasonality. Among the tested models, ARIMA (2,2,3) and ARIMAX (2,0,2) with Log (Population), GDP per capita and CO₂ intensity were identified as the most suitable for forecasting. RMSE, AIC, BIC and MAPE of ARIMA (2,2,3) are 581.10, 674.05, 684.48 and 6.62 respectively and RMSE, AIC, BIC and MAPE of ARIMAX (2,0,2) are 350.92, 665.42, 681.48 and 3.99 respectively. Comparative analysis showed that the ARIMAX model outperformed the ARIMA model in terms of predictive accuracy, indicating that incorporating exogenous factors significantly improves forecasting performance. This study highlights the importance of time series modeling for environmental forecasting and provides valuable insights to manage carbon emissions in Sri Lanka.

Keywords: *Carbon dioxide emission, ARIMA, ARIMAX, RMSE, MAPE*

A hybrid modelling approach for forecasting fluvial flood occurrences in the Ratnapura area, Sri Lanka

K. S. Saubhagya¹, C. D. Tilakaratne¹, G. P. Lakraj¹, M. A. Mammadov²

¹*Department of Statistics, Faculty of Science, University of Colombo, Sri Lanka*

²*School of Info Technology, Faculty of Science, Geelong Warun Ponds Campus, Deakin University, Australia.*

Development of an effective flood forecasting and early warning system is not straightforward due to many reasons (e.g., extreme events, missing values). Ratnapura, located in the Kalu river basin is affected by frequent flooding, resulting in fatalities and damage to property. Due to the existing shortfall in a robust flood mitigation system in the area, this study proposes a novel approach to predict flood occurrences 3 days ahead. This approach consists of 3 stages: first, impute non-random missing values in the rainfall data; second, forecast three-days-ahead rainfall with high accuracy capturing its extreme and heavy intensities; and third, produce robust flood forecasts based on river level forecasts up to 3 days in advance. The study used daily climatic and hydrological data in both numeric and image forms for the period 2014-2020. A novel optimal weight allocation method was introduced to predict missing rainfall values of neighbouring stations, combining the predictions generated by Spatial Kriging and Multilayer Perceptron Neural Network. The proposed hybrid model resulted in lower RMSE and MAE values than the individual models. The selection of inputs and their past lags for the rainfall and water level forecasting models was done using Random Forest, Granger Causality test and Cross correlation analysis. The best Bi-LSTM model which provided the lowest RMSE and MAE, and the highest accuracy in forecasting extreme events was used to obtain three-days-ahead rainfall forecasts. This model was trained with the past fourteen days values of selected input variables (e.g., relative humidity, dew point, clouds). Three-days-ahead forecasts of the river level in Ratnapura were produced using a separate Bi-LSTM model trained with ten-days-back water level of the river at identified locations and actual rainfall at the target location. Then, rainfall and river level forecasts were used as the independent variables of a Time Series Regression model to further enhance the accuracy of the river level forecasts. Numerical experiments show that the proposed hybrid model is capable of forecasting actionable flood events 1, 2 and 3 days-ahead with accuracies of 80%, 80% and 100%, respectively.

Keywords: *Flood forecasting, Kalu river, Bi-LSTM, Missing values, Feature selection*

Acknowledgements: We acknowledge financial support from the University of Colombo, Sri Lanka.

Spatial-temporal analysis of the Colombo flight information region

P. K. A. D. N. H. Thilakarathne¹, C. D. Tilakaratne²

¹*Area Control Centre, Air Navigation Services Division, Colombo International Airport, Ratmalana, Sri Lanka*

²*Department of Statistics, Faculty of Science, University of Colombo, Sri Lanka*

The Colombo Flight Information Region (FIR), as an important airspace sector in the South Indian Ocean, has experienced a notable growth of air traffic movement in the past few years. The objective of this research is to examine the spatial and temporal distribution of aircraft movement in the Colombo FIR to determine trends in traffic, clustering patterns, and possible hotspots that could impact airspace capacity and safety. The main emphasis is on exploring the frequency and distribution of flight paths over time, and revealing patterns in directional flows and traffic concentrations. A vast dataset of aircraft positional and temporal observations for the years 2021-2023 was used, where each record corresponds to the movement of one aircraft through the region. The main variables were waypoint coordinates, entry/exit timings, aircraft direction, and flight routes. Kernel Density Estimation (KDE), Density-Based Spatial Clustering of Applications with Noise (DBSCAN) algorithm and Ordering Points to Identify the Clustering Structure (OPTICS), which is a spatial-temporal clustering technique, were applied to map traffic intensity and detect high-density clusters. The analysis also involved temporal aggregation to examine variations across months, seasons, and years. The results showed clear seasonal peaks in flight movements, with the busiest periods having the highest traffic counts. Flight paths were mainly concentrated around entry and exit points, as well as at certain crossing points inside the Colombo FIR. Cluster analysis highlighted these high-density waypoints, which may need attention for future sector restructuring or capacity improvements. This study yields useful information on the dynamics of air traffic in the Colombo FIR. These results can be used for decision making in air traffic management, for example capacity assessment, and in the introduction of performance-based navigation procedures. Continuous monitoring and analysis are proposed to develop airspace infrastructure at a rate commensurate with traffic demands to ensure safety and efficiency in the region.

Keywords: *Spatial-temporal analysis, Hotspot detection, Airspace capacity, Air traffic flow management*

Factors associated with chronic kidney disease of unknown aetiology in Sri Lanka

M. P. P. U. Chulasiri¹, R. V. R. V. Jayatillake²

¹*Anti Malaria Campaign, Colombo 05, Sri Lanka*

²*Department of Statistics, Faculty of Science, University of Colombo, Sri Lanka*

Chronic Kidney Disease of Unknown Aetiology (CKDu) is a growing public health challenge in Sri Lanka, particularly in the North Central Province. This study aimed to identify risk factors associated with incident CKDu status (yes/no) using data from a longitudinal cohort study in Anuradhapura, conducted between 2018 and 2023. A cohort of 729 participants aged 20–60 years with normal renal function was recruited in 2018 from a 2017 cross-sectional survey. Individuals with diabetes, hypertension, pregnancy, or undergoing cancer treatment were excluded. Data on socio-demographic factors, lifestyle habits, and clinical parameters were collected annually via structured interviews, physical examinations, and laboratory investigations. This is the first longitudinal cohort study in Sri Lanka to assess CKDu risk using advanced statistical methods such as Generalized Linear Mixed Models (GLMM) and balancing of data with Synthetic Minority Oversampling Techniques (SMOTE). Descriptive statistics summarized baseline characteristics. Associations between categorical variables and CKDu were explored using chi-square and Fisher's exact tests. Year-wise logistic regressions identified potential predictors. To address class imbalance, SMOTE was applied in Python. GLMM with a logit link function were used to account for repeated measures and intra-individual variability, making them more appropriate than standard logistic regression in this longitudinal setting. In this cohort, the follow-up rate declined over time, while the cumulative CKDu prevalence rose from 3.8% to 12.4%. GLMM analysis showed that elevated blood pressure (odds ratio (OR) = 10.44, p -value (p) < 0.001; reference: normal blood pressure), hypertension (OR = 2.39, p < 0.001; reference: no hypertension), family history of CKDu (OR = 2.33, p < 0.001; reference: no family history), and family history of diabetes (OR = 2.16, p < 0.001; reference: no family history) were positively associated with CKDu risk. Protective factors included higher education (OR = 0.64, p < 0.001; reference: no formal education), underweight (OR = 0.41, p < 0.001; reference: normal BMI) and overweight/obesity (OR = 0.50, p < 0.001; reference: normal BMI), which were negatively associated with CKDu risk.

Keywords: CKDu, Cohort study, Risk factors, GLMM, SMOTE

A preliminary measurement and analysis of the altitudinal variation of beryllium-7 and other atmospheric isotopes in Colombo, Sri Lanka

D. M. S. R. Alwis¹, M. R. Lamabadusuriya¹, J. S. Wickremasinghe¹, C. Sumithrarachchi²

¹*Department of Nuclear Science, Faculty of Science, University of Colombo, Sri Lanka*

²*Facility for Rare Isotope Beams, Michigan State University, East Lansing, Michigan, USA*

Beryllium-7 (Be-7) is a cosmogenic atmospheric radionuclide produced by cosmic rays in the Earth's stratosphere. These radionuclides are deemed remarkably useful as tracers in global atmospheric studies, due to their nature, whereupon production, the isotope is absorbed to aerosols, and is carried with atmospheric currents. These studies can be used to develop atmospheric models to provide data for highly economically and socially impactful purposes in any country. Such atmospheric studies have never been performed in Sri Lanka, even though a large majority of global studies are performed through air sampling techniques. This study aimed to establish a preliminary measurement through a combination of sampling followed by alpha spectroscopy, and in-situ gamma spectroscopy at the University of Colombo premises in Sri Lanka. Both spectroscopy techniques were performed at a low altitude (13 m above sea level) and at an elevated altitude (37 m above sea level), to obtain two sets of spectroscopical data. The Be-7 activity was recorded on average to be 17 (± 1.6) Bq at low altitude and 71 (± 1.6) Bq at high altitude. Alpha spectroscopy resulted in the detection of Po-210, Bi-212, Po-214 and Po-212, where the most prominent isotope, Po-214 was measured at 11 (± 1.1) Bq at low altitude and 6 (± 1.1) Bq at high altitude. The study revealed a distinct difference in the activity of atmospheric radionuclides, and conclusively provided preliminary evidence for altitudinal atmospheric movement, thus setting a baseline measurement in Colombo. Further studies to be carried out at other locations and altitudes are planned, to extend the study to the entire country, and to increase the robustness of the method used in the current study.

Keywords: *Atmosphere, Beryllium-7, Radioisotope, Environment*

A feasibility study of the production of ^{131}I to be used in radioimmunoassay in Sri Lanka

M. Perera¹, R. Thenabadu¹, M. Lamabadusuriya¹, C. Sumithrarachchi²

¹*Department of Nuclear Science, Faculty of Science, University of Colombo, Sri Lanka*

²*Michigan State University, Michigan, USA*

^{131}I is a major radioisotope in nuclear medicine, extensively employed both to diagnose and treat differential thyroid cancers and to manage hyperthyroidism. For therapeutic purposes ^{131}I is required in higher doses, typically exceeding 10 mCi, depending on the stage of the cancer. Beyond its primary roles, ^{131}I is also utilized as a radiolabelled tracer in Radioimmunoassay (RIA) for quantitative detection of hormones, proteins and other antigenic substances. Typical ^{131}I activity used per RIA test ranges from 0.5 to 2 μCi . Since thyroid cancer diagnosis and therapy are critically important, Sri Lanka imports ^{131}I from neighbouring countries at a high cost because it does not have a domestic radioisotope production facility. Consequently, the accessibility of ^{131}I for RIA research in Sri Lanka remains limited, due to its high demand and high importation costs. This study examines the feasibility of producing ^{131}I in Sri Lanka using the neutron activation facility available at the University of Colombo. Considering the current neutron flux of the available source, the focus was placed on generating activity levels appropriate for RIA applications, rather than aiming for the much higher doses required for diagnostic and therapeutic uses. Five grams of 99.9% enriched ^{130}Te was irradiated with a flux of approximately 2.25×10^5 neutrons/cm²/s. During irradiation, ^{130}Te undergoes a nuclear reaction $^{130}\text{Te}(n,\gamma)^{131}\text{Te}$ and the resulting ^{131}Te (half-life~25 minutes) decays to ^{131}I (half-life~8 days). The production was monitored using a gamma spectroscopy with a sodium iodide scintillation detector. After 40 irradiation cycles, an activity of 6.1 ± 0.3 nCi was measured, demonstrating the feasibility of local ^{131}I production. Utilizing a neutron source with significantly higher flux (approximately 2×10^8 neutrons/cm²/s) and irradiating for more cycles would allow achieving the required RIA dose more readily. The ^{131}I separation process is ongoing and will be reported in future. Preliminary trials using irradiated KIO_3 and the wet distillation protocol achieved a separation efficiency of 68%.

Keywords: *Neutron activation, Radioimmunoassay, ^{131}I Production and separation*

TRACK 3: CHEMISTRY

Suppression of lipid accumulation by water-extracts of red mold rice through down-regulation of PPAR γ and C/EBP α transcription factors

I. P. Wanninaika, M. N. Kaumal, C. Hettiarachchi

Department of Chemistry, Faculty of Science, University of Colombo, Sri Lanka

Recently, water-soluble secondary metabolites from *Monascus* fermented red mold rice (RMR) have gained attention as a potential alternative treatment for obesity and overweight. Peroxisome proliferator-activated receptor γ (PPAR γ) and CCAAT/enhancer-binding proteins (C/EBPs) are crucial regulators involved in the proliferation and differentiation of adipocytes. The current study aimed to investigate the impact of water-soluble adipogenesis-inhibiting compounds from RMR water-extracts on the adipogenic transcription factors PPAR γ and C/EBP α . Lovastatin and citrinin free RMR water-extracts produced by the *Monascus pilosus* NBRC4507 strain grown at 30 °C for 10, 14, 17 and 21 days were introduced at concentrations of 0.50, 0.75, 1.00 mg/mL to evaluate their inhibitory effects on lipid accumulation in 3T3-L1 adipocytes using Oil red O staining. In addition, the effect of RMR water-extract on TG accumulation, GPDH activity and glycerol release was observed. The effect of RMR water-extract on the expression of PPAR γ and C/EBP α was examined using RT-PCR. When compared to the percentage adipogenesis inhibition of $35.31 \pm 1.57\%$ by the positive control lovastatin (2.02 mg/mL), the water-extracts from 14 days cultured RMR showed significant adipogenesis inhibitory activities ($28.30 \pm 3.44\%$ for 0.50 mg/mL, $37.5 \pm 4.44\%$ for 0.75 mg/mL, and $46.1 \pm 3.52\%$ for 1.00 mg/mL). The RMR water-extracts significantly inhibit TG accumulation and GPDH activity of 3T3-L1 adipocytes while promoting the glycerol release from 3T3L-1 cells in a concentration-dependent manner indicating the promotion of lipolysis and reducing the lipogenesis. Compared to the positive control lovastatin, the expression of PPAR γ was found to be significantly suppressed by the RMR water-extracts by 0.48 ± 0.045 , and 0.40 ± 0.117 at a final concentration of 0.75 and 1.0 mg/mL, respectively and the expression of C/EBP α was also suppressed at a final concentration of 0.75 (0.66 ± 0.109), and 1.00 mg/mL (0.57 ± 0.136). In conclusion, the inhibitory effect of 14-day cultured RMR water extracts from *Monascus pilosus* NBRC4507 on adipocyte differentiation is primarily due to the downregulation of the transcription factors PPAR γ and C/EBP α , resulting in both reduced lipogenesis and enhanced lipolysis.

Keywords: *Lipogenesis, Lipolysis, Monascus pilosus, RMR water-extract, 3T3-L1 cell*

Exploring the potential of tea polyphenols to reduce citrinin production during black tea fermentation with *Monascus purpureus*

P. Subasinghe^{1,2}, M. N. Kaumal¹, U. P. S. Hasara¹, G. Abewickrama², C. Hettiarachchi¹

¹Department of Chemistry, Faculty of Science, University of Colombo, Sri Lanka

²Basilur Tea Exports (Pvt)Ltd, Sri Lanka

The use of *Monascus purpureus* in functional food development is well established due to its production of bioactive metabolites such as pigments and monacolins. However, its ability to produce citrinin, a nephrotoxic mycotoxin, has raised safety concerns, limiting its applications. It has been shown that polyphenols found in tea interfere with fungal secondary metabolite biosynthesis. This study investigates the suitability of black tea (*Camellia sinensis*) as a fermentation substrate for *M. purpureus* and explores the potential influence of tea polyphenols on citrinin production. Fermentations were carried out using sterilized black tea infusions and solid tea substrates under both submerged and solid-state conditions, inoculated with *M. purpureus* (ATCC 16362). Traditional rice and cereal based substrates were used as positive controls. Total polyphenol content was assessed using the Folin-Ciocalteu method, and citrinin was checked at days 3, 7, 14, and analyzed using thin layer chromatography (TLC) with a DCM: ethyl acetate: methanol (3:2:1) solvent system. Separated spots on TLC plates were visualized under UV light at 336 and 254 nm wavelengths and compared with the citrinin standard. TLC provided qualitative and semi-quantitative estimates. The results confirmed robust fungal growth and the characteristic red-orange pigment production of *M. purpureus* on black tea substrates, demonstrating capability of tea as a fermentation medium. Citrinin levels in rice-based controls ranged from approximately 90 to 120 µg/kg during the fermentation period. In contrast, citrinin in black tea-based samples were lower than 15 µg/kg or below the detection limit. Both submerged and solid-state fermentations showed an approximately 85% reduction in citrinin production. Although no correlation analysis between polyphenol content and citrinin level was conducted, the observed reduction suggests a possible inhibitory role of tea polyphenols. In conclusion, black tea provides a promising natural substrate for *Monascus* fermentation, with the added advantage of substantially lowering citrinin contamination. Further work, including polyphenol-depleted controls, pigment quantification, replication, and statistical correlation are underway to confirm the specific role of tea.

Keywords: *Monascus purpureus*, Black tea, Polyphenols, Citrinin inhibition, Functional fermentation

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Improving the properties of asphalt binder 60/70 by incorporating naphthalene-containing mineral oil derived from petroleum by-products

W. S. U. S. Wijenayaka, S. M. Vithanarachchi

Department of Chemistry, Faculty of Science, University of Colombo, Sri Lanka

Bitumen, a black and opaque hydrocarbon mixture, serves as a critical binder in asphalt due to its adhesive and binding properties. However, asphalt pavements, particularly those utilizing 60/70 penetration grade bitumen, commonly experience challenges such as rutting, cracking, and deformation under moderate to elevated temperatures. These distresses prevalent on local road surfaces underscore the need for enhanced bitumen performance to extend pavement durability. This study aims to enhance the properties of 60/70 penetration grade bitumen by incorporating naphthalene containing mineral oil, which is a by-product in the petroleum industry. The primary objectives of the study include achieving a finely structured bitumen matrix, maximizing aggregate coating efficiency, developing asphalt mixtures with superior performance at reduced bitumen content, mitigating common asphalt-related defects, and realizing environmental and economic benefits through sustainable modifications. The modification process involved blending naphthalene-containing industrial oil with 60/70 bitumen at varying concentrations (1–9%, w/w) under ambient conditions. Gas chromatography-mass spectrometry analysis was employed to precisely identify and quantify naphthalene content (22.7%) in the industrial oil. The π - π stacking mechanism between naphthalene and bitumen aromatic fraction is expected to improve the mechanical performance without compromising the fundamental integrity of the material. The naphthalene-modified bitumen, containing 5% oil exhibited improved aggregate coating ability (99%), yielding more uniform asphalt mixture with enhanced durability and fewer weak zones. The dynamic shear rheometer value (performance grade 58) for the modified bitumen, clearly demonstrated its suitability for road construction in Sri Lanka, ensuring optimal performance under the region's challenging high-temperature and traffic conditions. The stiffening effect evidenced by reduced flow values imparts greater rigidity and reduced plasticity, which effectively minimizes the permanent deformations. Furthermore, the modified binder facilitated the use of lower bitumen content in the standard mixture, offering a cost-effective alternative. This research successfully demonstrates that naphthalene-containing mineral oil serves as an effective and economical additive for enhancing the performance of bitumen. The findings contribute valuable insights to the field of bitumen modification, providing a practical and sustainable approach to address common asphalt pavement distresses with a potential to apply in road constructions.

Keywords: *Naphthalene, Bitumen, Extra black asphalt, Mineral oil, Aggregate coating ability*

Synthesis of ZnO nanoparticles using plant extracts containing saponins and investigation of their antibacterial activity

A. N. Wagarachchi, S. M. Vithanarachchi

Department of Chemistry, Faculty of Science, University of Colombo, Sri Lanka

Zinc oxide (ZnO) nanoparticles are widely recognized for their biomedical potential due to the unique physicochemical properties and antibacterial capabilities. This study presents a plant extract-based synthesis approach utilizing ethanol extracts from *Ricinus communis*, *Sapindus trifoliatus*, and *Neolitsea cassia*, which contain surface-active phytochemicals such as saponins, to enhance particle stability. The objective was to develop a phytochemical-mediated synthesis method and evaluate the antimicrobial activity. The biosynthesis of ZnO nanoparticles was performed using co-precipitation method in ethanol extracts of selected plant species in the presence of zinc acetate dihydrate as the precursor. Synthesized particles were characterized by UV-vis, FTIR spectroscopies, X-ray diffraction (XRD), scanning electron microscopy (SEM), and thermogravimetric analysis (TGA). Results confirmed particle sizes ranging from 110 to 128 nm and distinct morphologies, including flake like (*Ricinus communis*), hexagonal (*Neolitsea cassia*), and sheet-like (*Sapindus trifoliatus*) forms, depending on the plant extract used in the synthesis. FTIR spectra indicated the presence of saponin-associated functional groups suggesting their incorporation into ZnO nanoparticles. XRD analysis demonstrated the crystalline nature of the particles. Based on the TGA studies, particles were stable up to 400 °C. Also, UV-vis spectra of ZnO nanoparticles synthesized using the three plant extracts exhibited characteristic absorption peaks around 365 nm, consistent with the formation of ZnO nanostructures. Antimicrobial activity of synthesized materials was performed using the percentage inhibitory method by calculating the percentage of number of colony forming units present compared to the neutral control. Antimicrobial activity against *Escherichia coli* (Gram-negative) and *Staphylococcus aureus* (Gram-positive) showed pronounced antibacterial effects for all plant-mediated ZnO nanoparticles, with inhibitions ranging from 51.7–82.7 % against *E. coli* and 45.5–86.4 % against *S. aureus*. ZnO particles without plant extract showed an inhibition of ~70% for both strains. Notably, ZnO nanoparticles synthesized from *R. communis* exhibited the highest inhibition, 86.4% and 82.7%, against *E. coli* and *S. aureus*, respectively. These findings indicate an enhanced antibacterial response by *R. communis*-mediated ZnO nanoparticles, which may be attributed to potential generation of reactive oxygen species facilitated by bioactive compounds from plant extract.

Keywords: *Phytochemicals, Zinc oxide nanoparticles, Saponins, Gram-negative bacteria, Antimicrobial activity*

Immunofluorescence based characterization of Dengue Non-Structural Protein 1 (NS1) intracellular localization in hepatic and non-hepatic cells

K. Sirisena, K. J. Wijesinghe

Department of Chemistry, Faculty of Science, University of Colombo, Sri Lanka

Dengue virus (DENV) non-structural protein 1 (NS1) is a secreted glycoprotein essential for viral replication and known to play a key role in disease pathogenesis. It is known to interact with multiple host factors and understanding its intracellular behavior is important for characterizing its host protein interactions. In this study, we investigated the subcellular localization of NS1 in hepatic and non-hepatic cell lines overexpressing the DENV NS1 protein using immunofluorescence coupled with fluorescence confocal microscopy. Four cell lines HepG2, HC-04 (hepatic), and HEK293T, MDA-MB-231 (non-hepatic) were reverse transfected with mammalian expression plasmid, which express the DENV NS1 gene in abundance mimicking the protein expression during viral infection. After 72 hours, cells were fixed, permeabilized, and probed with Anti-DENV NS1 antibody. Probed samples were further treated with fluorescent conjugated secondary antibody to facilitate detection of NS1 protein via fluorescence microscopy. NS1 expression was successfully detected in all four cell lines. In HEK293T, MDA-MB-231, and HepG2 cells, NS1 showed a punctate cytoplasmic distribution consistent with previous reports of NS1 localization during active viral infection. This pattern suggests retention in the endoplasmic reticulum or association with secretory vesicles. In contrast, HC-04 cells showed a more diffuse cytoplasmic signal, which may reflect differences in protein processing or trafficking in this hepatic-derived line. Overall, our results demonstrate that transfected NS1 exhibits localization patterns similar to those observed during natural DENV infection, reinforcing the relevance of this model system for studying DENV NS1 intracellular behavior. In future studies, co-localization of DENV NS1 protein with organelle-specific markers will be conducted to identify the subcellular compartments involved in DENV NS1 trafficking and its intracellular functions during a viral infection.

Keywords: *Dengue virus NS1, Immunofluorescence, Fluorescence microscopy, Intracellular localization*

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Evaluation of heavy metal removal potential of *Terminalia catappa* leaves using biosorption

K. A. Y. Umayanganee, G. N. Silva, D. P. N. De Silva

Department of Chemistry, Faculty of Science, University of Colombo, Sri Lanka

The contamination of aquatic systems with toxic heavy metals is a significant environmental and health concern. This study assessed the biosorption potential of *Terminalia catappa* leaves for Pb^{2+} , Cd^{2+} , Hg^{2+} , As^{3+} , and Cr^{3+} ions. Batch experiments were conducted at pH ~ 6 , 30 °C, and contact times of 10–70 min. Initial metal concentrations were adjusted to 3–15 $\mu\text{g/L}$ for Pb, Cd, and Cr; 0.3–1.5 $\mu\text{g/L}$ for As; and 0.06–0.5 $\mu\text{g/L}$ for Hg, in order to evaluate adsorption behavior using the Langmuir and Freundlich isotherm models. Metal quantification was performed using ICP–MS. Adsorption data showed strong agreement with the Langmuir model ($R^2 = 0.98\text{--}0.99$), confirming monolayer adsorption. Maximum adsorption capacities (Q_{max}) were 14.2 $\mu\text{g/g}$ for Cd^{2+} , 4.8 $\mu\text{g/g}$ for Cr^{3+} , 3.2 $\mu\text{g/g}$ for Pb^{2+} , 0.2 $\mu\text{g/g}$ for As^{3+} , and 0.1 $\mu\text{g/g}$ for Hg^{2+} . Arsenic displayed the highest removal efficiency ($\sim 95\%$) at trace levels, while cadmium exhibited the greatest adsorption capacity overall. Lead showed moderate uptake ($\sim 75\%$). Freundlich modeling indicated favorable adsorption only for Cd^{2+} ($K = 1.05$, $R^2 = 0.9999$), with K representing adsorption capacity. Other metals showed weaker fits ($R^2 < 0.85$), further supporting Langmuir as the better model. Fourier transform infrared (FTIR) analysis revealed shifts in --OH stretching ($3293 \rightarrow 3296 \text{ cm}^{-1}$, broad peak), C=O stretching ($1730 \rightarrow 1736 \text{ cm}^{-1}$), and amide I ($1607 \rightarrow 1630 \text{ cm}^{-1}$), suggesting the participation of hydroxyl, carboxyl, carbonyl, and amide groups in binding. Though some shifts were small ($>5 \text{ cm}^{-1}$), their consistency indicated meaningful structural changes due to metal chelation. Overall, *T. catappa* leaves demonstrate potential as a sustainable biosorbent, with particular effectiveness towards Cd^{2+} and As^{3+} removal. Further investigation into regeneration and real wastewater performance is recommended for assessing field-scale applicability.

Keywords: *Terminalia catappa*, Biosorption, Heavy metals, FTIR, Langmuir isotherm

Breaking the cytokine storm: An *in-silico* study of bamboo shoot sterols as natural TNF- α brakes in severe Dengue

K. A. L. H. Gunathilaka¹, W. M. C. Sameera², G. N. Silva¹, N. I. Abeyasinghe¹

¹Department of Chemistry, Faculty of Science, University of Colombo, Sri Lanka

²Department of Space, Earth and Environment, Chalmers University of Technology,
SE-412 96 Gothenburg, Sweden

Severe dengue is primarily driven by cytokine storm and increased vascular permeability. Tumor necrosis factor-alpha (TNF- α), a key proinflammatory cytokine plays a central role in this process by promoting endothelial dysfunction and amplifying the cytokine storm. TNF- α activates downstream signaling by binding three receptor molecules. Currently, dengue has no approved antiviral treatments, with clinical care limited to supportive measures. Therefore, modulating TNF- α activity presents a promising therapeutic strategy for severe dengue intervention. Recent advances have demonstrated the potential of small molecules, such as A7A, to inhibit TNF- α by stabilizing an asymmetric conformation of the trimer. This conformation restricts receptor recruitment to two subunits, thereby impairing TNF- α signaling. Traditional Sri Lankan medicine advocates the use of juice of juvenile shoots of *Bambusa vulgaris* as a treatment for dengue. This study explores the inhibitory potential of phytochemicals from *Bambusa vulgaris* to modulate TNF- α function. A total of 22 phytochemicals from juvenile *Bambusa vulgaris* shoots were identified through literature and subjected to *in silico* ADMET screening using SwissADME and pkCSM. Compounds compliant with Lipinski's rule of five were selected for further analysis. The crystal structure of TNF- α in its asymmetric, ligand-stabilized form (PDB ID: 6OP0) was subjected to 1000 ns molecular dynamics (MD) simulations using CHARMM36m forcefield in GROMACS (version 2024.1) to obtain a stable protein conformation for docking studies. Molecular docking studies were conducted using AutoDock Vina (Version v1.2.5). Several sterols—ergosterol, β -sitosterol, campesterol, stigmasterol, and stigmastanol—demonstrated strong binding affinities ranging from -12.4 to -12.9 kcal/mol, surpassing that of the positive control A7A. These hits were further validated via 1000 ns MD simulations. This study underscores the potential of *Bambusa vulgaris* phytochemicals, particularly sterols, as natural TNF- α inhibitors. The findings provide a foundation for the development of novel, dietary interventions targeting TNF- α in the management of severe dengue. Although the binding affinities observed are promising, further experimental studies are required to confirm the inhibitory potential of these sterols against TNF- α .

Keywords: TNF- α , *Bambusa vulgaris*, Cytokine storm, Molecular docking, Molecular dynamics

A need analysis of Sri Lanka's secondary education practices: Identifying required reforms for authentic teaching and learning to address skills mismatch

B. M. Hewa Siliyange¹, L. S. I. Liyanage², T. P. Rupasinghe³, N. de Silva¹, A. Tillekaratne¹

¹*Department of Chemistry, Faculty of Science, University of Colombo, Sri Lanka*

²*Department of Computing and Technology, University of Kelaniya, Sri Lanka*

³*Student Affairs, Pennsylvania State University, USA*

Sri Lanka's labour market faces a skills mismatch, hindering economic growth. The study showcases the initial phase of a larger investigation to address this gap by examining how secondary education can better equip young individuals with essential skills. A mixed-methods approach was employed, starting with 23 in-depth interviews of stakeholders, including parents, teachers, and students with diverse backgrounds ranging from school to university students and professionals holding dual roles as teachers and parents. Participants were selected purposively. Interviews were followed by a nationwide survey of 911 respondents including professionals and students. The study highlights a consensus among the respondents for urgent educational reforms, primarily on curriculum content, teaching methods, and assessment. It highlighted the urgency for a curriculum appropriate to the labour market demand. Findings suggested curriculum revisions coupled with enhanced opportunities for authentic education via stronger industry collaboration, integrated with authentic teaching methods, emphasizing the importance of practical skill development and soft skills training. The study also highlights the need to consider external factors such as limited stakeholder awareness, resistance to change, and high competition within education systems to ensure a successful change of practices. Aligning authentic education with local needs and external factors, the study lays the foundation for educational practice reforms, bridging the gap between education and labor market demands while fostering sustainable social and economic development.

Keywords: *Skills mismatch, Secondary education, Authentic teaching*

TRACK 4: BIOLOGICAL SCIENCE

Evaluation of the performance of network-based protein function prediction algorithms on protein-protein interaction networks in plants

M. A. S. U. Piyatissa, T. L. S. Tirimanne, S. P. C. Fernando

Department of Plant Sciences, Faculty of Science, University of Colombo, Sri Lanka

Protein-protein interaction (PPI) networks are used to elucidate functional information of proteins in the absence of experimental data. Many network-based algorithms have been developed for this purpose leveraging the guilt-by-association principle. However, these methods have not been evaluated on plant networks to date. Plant PPI networks differ from those of other organisms due to plant-specific functions such as photosynthesis and root development, etc. Therefore, a systematic evaluation was conducted on six network-based protein function prediction algorithms (majority voting (mv), hishigaki (hm), markov random fields (mrf), random walk (rw), random walk with restart (rwr), and page rank (ppr)) over three plant PPI networks (*Arabidopsis thaliana*, *Oryza sativa japonica*, and *Zea mays*). High-confidence plant PPI networks were obtained from the STRING database, and Gene Ontology (GO) annotations with experimental evidence were sourced from AMIGO. The algorithms were implemented in Python and R, and evaluated using ten-fold cross-validation. Performance was measured on the following metrics: area under the receiver operator curve (AUROC), area under the precision-recall curve (AUPR), $F_{\max}$, and the average precision (AP). While AUROC scores were generally high (0.6–0.9), AUPR and AP values were lower (0.07–0.5). These values highlighted the challenge posed by class imbalance. $F_{\max}$ indicated a more balanced performance (0.1–0.6) since it captures the trade-off between precision and recall. Interestingly, *Z. mays* excelled in precision–recall based metrics and balanced performance, whereas *A. thaliana* achieved the highest AUROC scores. Among algorithms, ppr and rwr consistently delivered the best results though simpler methods such as mv and hm occasionally performed competitively, likely due to dataset-specific characteristics. This evaluation highlights the effectiveness of propagation-based algorithms such as ppr and rwr for function prediction in plant PPI networks. Nonetheless, evaluating multiple algorithms remains important, as performance varies across species and network structures.

Keywords: *Plants, Proteomics, Protein-protein interaction networks, Function prediction, Benchmarking*

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Adaptive responses of stomatal characteristics of mangroves to diverse salinity levels

R. Krishanthiny¹, H. I. U. Caldera², T. Mathiventhan¹, K. G. S. U. Ariyawansa²

¹Department of Botany, Faculty of Science, Eastern University, Sri Lanka

²Department of Plant Sciences, Faculty of Science, University of Colombo, Sri Lanka

Mangroves are well adapted to life in saline habitats, and among other responses, stomatal responses contribute to this adaptability. Stomata are sensitive to environmental changes and play a key role in photosynthesis and transpiration. There have been limited studies on how different mangrove species adapt their stomatal responses in diverse saline environments. This study investigates stomatal characteristics (stomatal conductance, length, width, density, index, and pore length & width) of three common mangrove species (*Avicennia marina*, *Excoecaria agallocha*, and *Lumnitzera racemosa*) from selected sites with different salinity levels along the eastern coast of Sri Lanka, during wet (WS) and dry (DS) seasons. The sites were Sathurukondan (WS: 0.6 ppm; DS: 6.1 ppm), Thampalagamam (WS: 2.9 ppm; DS: 15.2 ppm) and Panama (WS: 9.6 ppm; DS: 32.8 ppm). Leaf samples were taken from three individual plants per species per site. Field measurements of stomatal conductance were recorded with a leaf porometer (Meter Group 40419-SC-1) (air temperature 25°C to 31°C during WS and 32°C to 37°C during DS). Stomatal characteristics were measured using fluorescence microscopy and PROVIEW Software. Pearson correlation and one-way ANOVA were carried out using MINITAB 18. Results revealed significant interspecific and site-specific variations. Stomatal conductance negatively correlated with salinity and differed significantly ($p < 0.05$) among sites, with higher values in the lower salinity site (Sathurukondan). Stomatal conductance was significantly higher ($p < 0.05$) in WS, whereas other stomatal characteristics were lower in this season. In general, *E. agallocha* had a larger stomatal size (length and width), followed by *L. racemosa* and had the highest stomatal index (16.1–10.4%). *A. marina* had significantly smaller stomata. This was coupled with the highest stomatal density (131.3–102.6 stomata/mm²). *L. racemosa* showed the lowest stomatal density (63.6–37.2 stomata/mm²), stomatal index (8.8–6.9%) and stomatal conductance. Overall, stomatal density and index significantly decreased with increasing salinity. These stomatal responses likely facilitate water conservation in highly saline environments, contributing to the mangroves' survival in coastal environments. The study underscores the importance of stomatal characteristics when selecting species for restoration efforts, as these traits may enhance the species' ability to cope with salinity stress and ensure restoration success.

Keywords: Mangroves, Salinity, Season, Stomata

Microbiological quality of spices from Small & Medium-Scale Enterprises (SMEs) in Sri Lanka

G. Thamira¹, C. M. Nanayakkara¹, U. Rajawardana², D. Jayawardana²

¹*Department of Plant Sciences, Faculty of Science, University of Colombo, Sri Lanka*

²*Industrial Technology Institute (ITI), Malabe, Sri Lanka*

This study evaluated the microbiological quality of spices from Small and Medium-scale Enterprises (SMEs) in Sri Lanka to assess potential microbial risks. Samples submitted to the Industrial Technology Institute (ITI) by the SMEs for routine analysis were used in the study. Eighty-four spice samples, including curry powder, chili powder, chili pieces, turmeric powder, pepper powder and cinnamon powder were analyzed for moisture content, yeast and mold counts, *Escherichia coli* counts, and the presence of *Salmonella* using the standard ISO methods; ISO 927:2009, ISO 21527-1:2008, ISO 4831:2006, and ISO 6579-1:2017, respectively. Results showed notable variation in microbial contamination among spice types. Yeast and mold counts ranged from 3.8×10^2 to 3.4×10^5 CFU/g, with the highest contamination in chili powder (3.4×10^5 CFU/g), followed by curry powder (2.9×10^5 CFU/g), chili pieces (2.6×10^5 CFU/g), turmeric powder (1.8×10^5 CFU/g), and cinnamon powder (1.2×10^5 CFU/g). Only pepper powder (3.8×10^2 – 7.1×10^4 CFU/g) complied with the ISO 21527-1:2008 limit of 3×10^4 CFU/g. *E. coli* was detected in 28.6% of curry powder, 50.0% of chili powder, and 14.3% of chili pieces, with counts ranging from 3 to 43 MPN/g, exceeding the zero-tolerance limit set by ISO 4831:2006. Turmeric, pepper, and cinnamon powder showed no *E. coli* contamination. All samples tested were negative for *Salmonella*, in compliance with ISO 6579-1:2017. Moisture content across all spice types ranged from 6.2% to 11.8%, with the highest in curry powder (11.8%) and the lowest in pepper powder (6.2%), remaining within ISO 927:2009 limits. Correlation analysis revealed no statistically significant relationships between moisture content and yeast/mold counts ($r = -0.35$, $p=0.499$) or *E. coli* counts ($r = -0.45$, $p=0.368$), indicating that moisture content alone is not the determining factor for microbial contamination. The findings highlight the need for Good Agricultural Practices (GAPs) and Good Manufacturing Practices (GMPs) to improve hygiene and sanitation throughout production. Recommendations include enhancing storage and transport conditions, regular food safety training for producers and workers, and stronger regulatory oversight. This study provides important insights into the microbiological quality of spices from Sri Lankan SMEs and emphasizes measures to ensure food safety and consumer protection.

Keywords: *Microbiological quality, Spices, Small and Medium-scale Enterprises, Sri Lanka*

Plant Growth-Promoting Potential of Endophytic Fungi (PGPEF) isolated from *Avicennia marina* in enhancing growth parameters of chili plants

K. Thushanthan¹, T. Mathiventhan¹, H. I. U. Caldera², N. N. Wijayawardene³,
K. G. S. U. Ariyawansa²

¹Department of Botany, Faculty of Science, Eastern University, Sri Lanka

²Department of Plant Sciences, Faculty of Science, University of Colombo, Sri Lanka

³Center for Yunnan Plateau Biological Resources Protection and Utilization,
Qujing Normal University, Qujing, Yunnan Province, 655011 P.R. China

Endophytic fungi are known to produce a wide range of bioactive secondary metabolites, including phytohormones that promote plant growth through various mechanisms. This study aimed to identify and characterize Plant Growth-Promoting Endophytic Fungi (PGPEF) associated with *Avicennia marina* and to evaluate their potential as bio inoculants for enhancing seed germination and growth performance of chili plants under greenhouse conditions. Putative fungal endophytes were isolated from tissues of *A. marina* collected from the Batticaloa Lagoon, Sri Lanka, and assessed for their production of plant growth-promoting hormones, namely indole-3-acetic acid (IAA) and gibberellic acid (GA). Based on its phytohormone production levels, a promising isolate, AVEN 01 (identified as *Fusarium sulawesiense* through ITS sequencing), was selected for cross-inoculation into chili (*Capsicum annuum*) plants under controlled pot-scale conditions to evaluate its effects on plant growth parameters. Chili seeds were surface sterilized, treated with a systemic fungicide for four hours, and then primed in a fungal mycelial suspension of *F. sulawesiense* for 12 hours before sowing. Seedlings were transplanted into sterile pots containing sterile potting mixture (T₁), pots containing sterile potting mix inoculated with *F. sulawesiense* (T₂). T₁, T₂ and control (T₃ - seeds treated with systemic fungicide and sown in sterile potting mix), were maintained under greenhouse conditions (30 °C, 70% relative humidity, 8:16 hours light/dark photoperiod). Treatments were arranged in a completely randomized design with eight replicates. One-way ANOVA revealed that T₂ showed significant results ($p < 0.05$) in germination and plant growth parameters. By 12 weeks (during harvesting), T₂ exhibited the highest values for plant height (42.25 ± 1.81 cm), leaf number (116.5 ± 5.55), chlorophyll content (55.19 ± 3.82 SPAD units), stem diameter (2.20 ± 0.10 mm), number of flowers (25.87 ± 1.88), number of pods (20.75 ± 2.25), and pod length (5.75 ± 0.13 cm). T₂ showed around 1.5 times higher values on its parameters when comparing control and other treatments. These findings highlight the potential of *F. sulawesiense* as an effective PGPEF for enhancing chili growth under controlled conditions.

Keywords: Endophytic fungi, Growth promotion, Seed priming, Gibberellic acid, Indole-3-acetic acid

Understanding the trace element landscape of Sri Lankan rice: Distribution and correlational patterns of toxic heavy metals and essential elements

J. W. Gunawardana¹, S. A. Gunawardena², C. Witharana³, N. D. A. Wageesha⁴, I. C. Perera¹

¹Department of Zoology & Environment Sciences, Faculty of Science,
University of Colombo, Sri Lanka

²Department of Pathology & Pharmacology, International Medical University, Malaysia

³Department of Biochemistry & Molecular Biology, Faculty of Medicine,
University of Colombo, Sri Lanka

⁴Department of Biochemistry, Faculty of Medicine, Sabaragamuwa University of Sri Lanka

Sri Lankan rice is a potential source of nutritionally important essential elements (EEs) and undesirable co-contaminants which include heavy metals (HMs). EEs have an antagonistic response to HMs, by counteracting/detoxifying their effects. Therefore, a higher EE:HM ratio would have more nutritional value. This study investigated and compared cadmium (Cd), arsenic (As), lead (Pb), chromium (Cr) and EEs; zinc (Zn), selenium (Se), manganese (Mn), cobalt (Co) levels in 24 grain composites of commonly consumed rice (Traditional, Improved, Imported) varieties in Sri Lanka. Lyophilized grain powders were digested (*in-vitro*) and profiled using ICP-MS. The mean ($\pm$ SD) and median (IQR) of the total HMs and total EEs were; 0.601 ± 0.275 , 0.702 (0.411) mg kg^{-1} and 46.545 ± 9.136 , 46.968 (13.158) mg kg^{-1} , respectively. The Total-HMs showed a weak positive correlation to Total-EEs ($T_b = 0.101$, $p > 0.05$). The distribution of Cd showed positive correlations with all EEs, and with a statistically significant moderate correlation with Mn ($T_b = 0.315$, $p < 0.05$). Pb positively correlated with all EEs ($p > 0.05$). However, As positively correlated only with Zn ($T_b = 0.131$, $p > 0.05$) and correlated negatively with Se ($T_b = -0.136$, $p > 0.05$), Mn ($T_b = -0.116$, $p > 0.05$) and Co ($T_b = -0.004$, $p > 0.05$). Cr positively correlated with Zn ($T_b = 0.171$, $p > 0.05$) and Co ($T_b = 0.298$, $p < 0.05$) while negatively correlated with Se and Mn ($p > 0.05$). The EE:HM ratio in the total rice sample ranged from 35.04 to 479.11. The median EE:HM ratio was higher in red pericarp grains compared to white and in parboiled rice than in non – parboiled rice ($p > 0.05$). The EE:HM ratio Traditional rice was ~1.8 times that of both Improved or Imported rice ($p > 0.05$). The median EE:HM ratios in Traditional rice decreased in the order *Kalu-heenati* > *Pachchaperumal* > *Suwandel* while the ratios from Improved and Imported categories decreased in the order of; *Red-kekulu* > *White-Nadu* > *Red Nadu* > *Indian Basmati* > *Red and White Samba* > *White-Kekulu*. The results suggest that despite the overall positive correlation of total-EEs to total-HMs, strategic supplementation of some EEs; Se, Mn could reduce HM accumulation in rice grains. Inclusion of rice varieties with a high EE:HM ratio (i.e. Traditional) in daily dietary habits can help mitigating the exposure to HM by consumers.

Keywords: Sri Lankan rice, Heavy metals, Essential elements, Toxic trace elements, Essential minerals

Acknowledgements: We acknowledge financial support from the University of Colombo.

Dynamics of blue carbon in mangroves in the Rekawa Lagoon, Sri Lanka: Integrating remote sensing and the InVEST model for coastal ecosystem management

W. K. Suwandhahannadi^{1,4}, D. Wickramasinghe¹, D. D. G. L. Dahanayaka², L. Le De³

¹*Department of Zoology and Environment Sciences, Faculty of Science,
University of Colombo, Sri Lanka*

²*Department of Zoology, Faculty of Natural Sciences, The Open University of Sri Lanka*

³*Auckland University of Technology, South Campus, Auckland, New Zealand*

⁴*National Aquatic Resources Research and Development Agency (NARA), Colombo 15, Sri Lanka*

Coastal blue carbon ecosystems store significant carbon, but are increasingly threatened by land-use changes, habitat degradation, and climate change. By measuring blue carbon, the hidden climate value of mangroves can be recognized, helping to prioritize conservation efforts and develop nature-based solutions that enhance both biodiversity and carbon storage. This study aimed to quantify the spatiotemporal changes of mangrove carbon storage in the Rekawa Lagoon, Sri Lanka, over a two-decade period (2001–2021), by integrating Land Use/Land Cover (LULC) maps with the InVEST model (Integrated Valuation of Ecosystem Services and Tradeoffs). Field assessments were conducted to estimate four carbon pools: above-ground biomass, below-ground biomass, soil organic carbon, and dead organic carbon across the sampling sites according to the Blue Carbon Manual. LULC maps for 2001, 2007, 2014, and 2021 were developed using the unsupervised classification technique in ArcGIS 10.6.1 to detect changes in mangrove extent. The recorded mangrove extents were 109, 92, 97, and 100 ha, respectively, in the four years considered. These LULC maps and carbon pool data were then used as inputs in the InVEST model to estimate above-ground, below-ground, soil, and total carbon stocks over a two-decade period. Results indicated that the mangrove extent of the Rekawa Lagoon showed an 8% loss over the study period, with a declining trend (16%) from 2001–2007, and a partial recovery from 2007–2014 (6%) and 2014–2021 (3%). The resulting carbon maps showed notable trends in both carbon sequestration and carbon emissions over the 20 years. The total carbon storage in mangroves was 75,949 MgC in 2001, declining to 63,888 MgC in 2007, followed by a gradual recovery to 67,783 MgC in 2014 and 69,730 MgC in 2021. The initial degradation of carbon stocks may be attributed to settlement expansion, habitat destruction, and the tsunami catastrophe, whereas the observed recovery trend suggests regeneration and conservation efforts. Therefore, the present study highlights the importance of integrating field data, remote sensing, and spatial modelling in assessing blue carbon dynamics. Further, this approach gives a robust scientific basis to develop evidence-based policy, carbon offset planning, and sustainable coastal zone management in Sri Lanka.

Keywords: *Blue carbon, InVEST model, Land use change, Mangroves, Rekawa Lagoon*

Understanding elephant crop raiding behaviour: Interrelations with land use patterns, crop characteristics, and social structure of male elephants

C. Fernando¹, D. Weerakoon¹, S. Pilapitiya², M. R. Wijesinghe¹, P. Fernando³

¹*Department of Zoology and Environment Sciences, Faculty of Science,
University of Colombo, Sri Lanka*

²*World Bank Environment and Natural Resources Global*

³*Centre for Conservation and Research, Sri Lanka*

The Human–elephant conflict (HEC) is a major conservation challenge in Sri Lanka, driven largely by agricultural expansion into natural habitats, leading to frequent crop raiding. Crop raiding leads to economic losses, threats to farmer safety, negative community attitudes, and results in many elephants being injured or killed each year. Understanding the spatial, ecological, and behavioral drivers is essential to developing effective mitigation strategies. This study examines how landscape features, crop characteristics, and male elephant grouping behaviour influence crop-raiding behavior in Wasgamuwa, Sri Lanka. Between 2018 and 2019, 491 crop-raiding incidents were recorded across 27 Grama Niladhari Divisions (GNDs) in Wasgamuwa. To investigate the factors influencing elephant crop-raiding behavior, a global generalized linear mixed model (GLMM) was constructed using binary crop-raiding data, comparing actual incidents against randomly selected control fields without damage. The model included five spatial variables (distance to electric fence and protected area, other refuge areas, man-made lakes, and home gardens), along with crop type, crop growth stage, and raider group structure (single males vs. male groups). The model was validated, and Akaike Information Criterion (AIC) was used to select the most parsimonious model. The model results revealed that crop raiding was not influenced by proximity to the protected area. However, fields located closer to refuge areas, tanks, and electric fences were associated with a higher risk of raiding. Further, fields situated farther from home gardens were more vulnerable to raids. Crop types strongly influenced raiding likelihood, with paddy fields and home gardens among the most raided, particularly during crop maturity stages. Solitary males primarily raided home gardens, while male groups were more likely to raid paddy fields. These findings highlight the complex interplay of spatial factors, crop characteristics, and the grouping behavior of male elephants in shaping crop-raiding patterns. Effective mitigation requires integrated landscape management and crop protection strategies tailored to field types, crop stages, and the distinct behavior. Such approaches are crucial for fostering coexistence in human-dominated landscapes.

Keywords: *Human–elephant conflict, crop raiding, landscape features, crop characteristics, male elephants*

Valuing Nature's Treasure: An integrated conservation valuation of the Muthurajawela Wetland, Sri Lanka

H. Dahanayake¹, D. D. G. L. Dahanayaka², P. Hudson³, D. Wickramasinghe¹

¹*Department of Zoology and Environment Sciences, Faculty of Science,
University of Colombo, Sri Lanka*

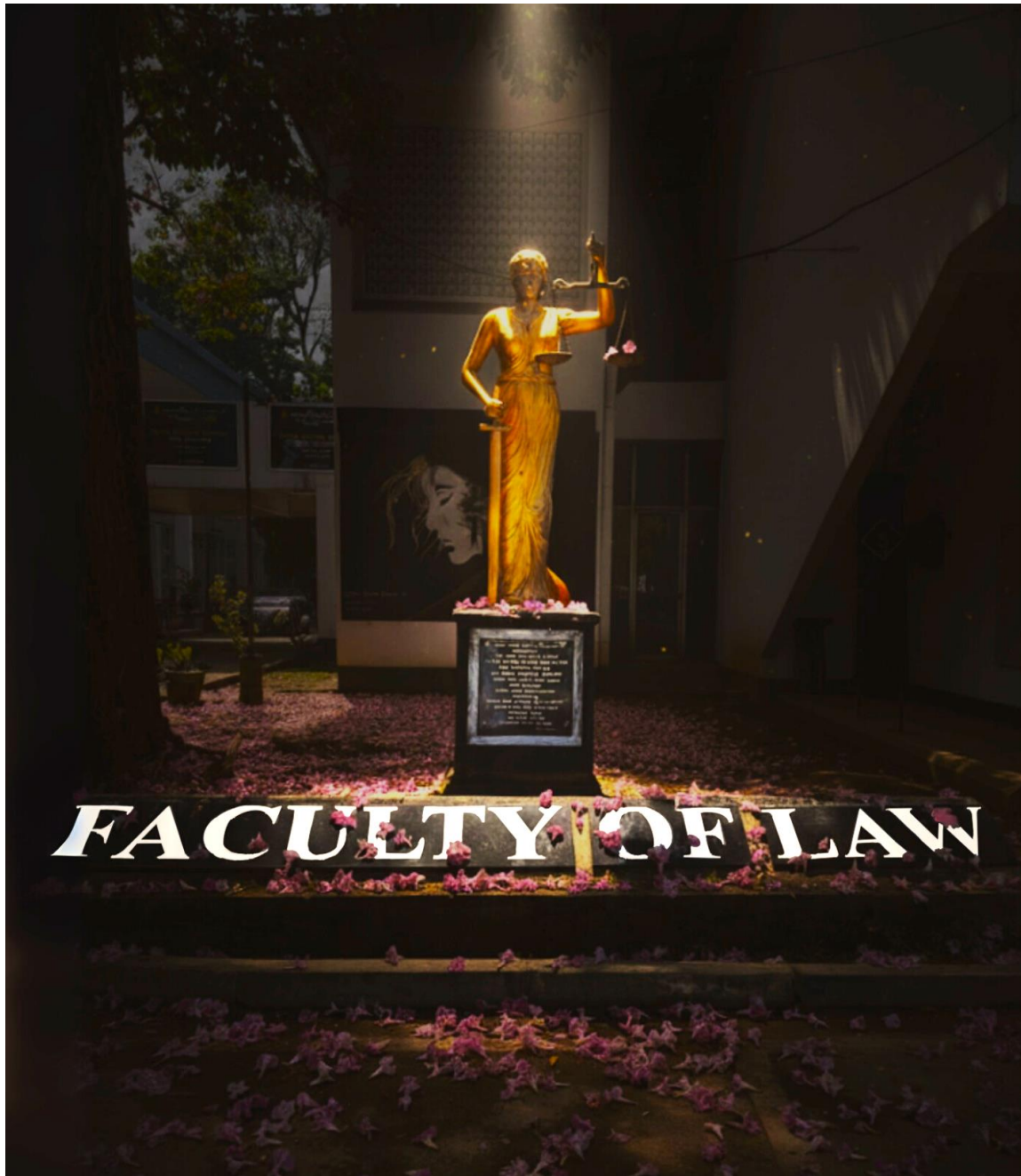
²*Department of Zoology, Faculty of Natural Sciences, The Open University of Sri Lanka*

³*Department of Environment and Geography, University of York, York, United Kingdom*

Muthurajawela Wetland (MW) is a key coastal ecosystem in Sri Lanka that provides many ecosystem services. However, increasing development is putting it at risk. This study aims to estimate the economic and social value of its ecosystem services to help guide sustainable management and protect its long-term benefits. To assess community perceptions and value of ecosystem conservation, data was collected through questionnaire surveys administered to 407 participants, consisting of female (72%) and male (28%) residents from nearby villages. The survey explored local views on the drivers of Land Use Land Cover (LULC) change, key ecological threats, and the effectiveness of current conservation policies. For the valuation component, a contingent valuation method was employed. Respondents were asked to indicate their willingness to pay (WTP) for conservation through five monthly payment options: Rs. 1,500, Rs. 3,000, Rs. 6,000, Rs. 9,000, or 'none of the above'. In parallel, willingness to contribute time (WTC) was also assessed using four voluntary time commitment levels: 10, 15, 25, and 30 hours per month. According to the results, 74.9% strongly agreed that their well-being is closely linked to the environmental condition of the MW, additional 22.4% expressed above-average agreement. Furthermore, observed changes include LULC changes (92.4%), landfilling (94.1%), vegetation clearing (92.6%), tree cutting (92.1%), construction activities (86.5%), and the establishment of agricultural or coconut farms (47.4%) and animal farms (10.3%). In terms of conservation support, 38.6% were willing to pay Rs. 3,000 per month, 36.4% to pay Rs. 6,000, 22% to pay Rs. 1,500 for and 3% to pay Rs. 9000. Additionally, 69.8% were willing to volunteer 25 hours per month, 15.3% to 15 hours per month and others offered 25 to 30 hours per month. The findings further suggested that women and those in low-income groups prefer volunteering time contributions. The results highlight a high level of awareness, willingness to engage, and community-driven commitment to wetland conservation efforts.

Keywords: *Muthurajawela Wetland, Conservation valuation, Willingness to pay, Willingness to time*

FACULTY OF LAW



The Role of Law in the Winds of Change

28th and 29th November 2025

MESSAGE FROM THE DEAN

Professor N. S. Punchihewa

*Faculty of Law
University of Colombo
Sri Lanka*



It is with immense pleasure that I extend my warmest greetings to all participants and contributors of the International Research Conference 2025, organized by the Faculty of Law, University of Colombo. This year's theme, "*The Role of Law in the Winds of Change*," reflects the dynamic and often unpredictable forces shaping our world today.

We are witnessing a period marked by rapid transformation in technological disruption, climate change, global health crises, political upheaval, and evolving notions of justice and governance. In such times, the law must serve not only as a stabilizing force but also as a proactive instrument that guides and facilitates meaningful change. Legal systems must respond to contemporary realities while upholding core values of justice, equity, and human dignity.

This conference aims to bring together diverse perspectives that critically examine how law interacts with change, whether through reform, resistance, or reinvention. It offers an opportunity for scholars, practitioners, and students to engage in meaningful discourse on how legal institutions can adapt and lead amidst uncertainty.

Also, I commend all researchers and contributors whose scholarly work has contributed to shaping this year's proceedings. Your insights are vital in informing policy, improving legal practice, and shaping the next generation of legal thoughts.

I take this opportunity to wish all the participants a fruitful and productive academic exercise and hope that the research papers discussed at the conference will aid the development of the law for the benefit of society at large.

MESSAGE FROM THE SYMPOSIUM CHAIR

Dr. Menaka Harankaha

*Department of Commercial Law
Faculty of Law
University of Colombo
Sri Lanka*



It is with great pleasure that I welcome you to the International Research Conference 2025 of the Faculty of Law, University of Colombo, to be held on the 28th and 29th of November. As the flagship academic forum of our Faculty, this Conference has become a vital platform where scholars, practitioners, and students from Sri Lanka and beyond converge to share insights, interrogate ideas, and advance the frontiers of legal knowledge.

The theme this year, “*The Role of Law in the Winds of Change*,” resonates deeply with the challenges of our time. In an era of social transformation, political reform, economic realignment, and technological disruption, the law carries the responsibility of guiding societies with resilience and foresight while upholding justice, democracy, and human dignity. This Conference offers a timely opportunity to reflect on how legal systems both respond to and are reshaped by these forces of change.

With more than seventy research papers covering Public Law, Private Law, Comparative Law, International Law, Commercial Law, and interdisciplinary fields, the Conference promises a rich and thought-provoking dialogue. As Chair, I am encouraged by the diversity of voices and perspectives represented, and I hope these two days will inspire meaningful exchange, collaboration, and new pathways of research and practice. I warmly invite you to engage wholeheartedly in this academic journey and wish you a stimulating and rewarding experience.

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SYMPOSIUM PROGRAMME

3.00 pm – 3.15 pm	Registration
3.15 pm – 3.20 pm	Lighting of the Oil Lamp
3.20 pm – 3.25 pm	National Anthem
3.25 pm – 3.35 pm	Welcome Address <i>Dr. Menaka Harankaha, Conference Chair, Department of Commercial Law</i>
3.35 pm – 3.45 pm	Introductory Remarks <i>Prof. N. S. Punchihewa, Dean, Faculty of Law</i>
3.45 pm – 3.55 pm	Address by the Vice-Chancellor <i>Prof. Indika Karunathilake, Vice-Chancellor, University of Colombo</i>
3.55 pm – 4.05 pm	Video Presentation
4.05 pm – 4.10 pm	Role of Law in the Winds of Change – Perspective of Private and Comparative Law <i>Dr. Udapadie Liyanage, Head, Department of Private and Comparative Law</i>
4.10 pm – 4.15 pm	Role of Law in the Winds of Change – Perspective of Public and International Law <i>Prof. Kokila Lankathilake Konasinghe, Head, Department of Public and International Law</i>
4.15 pm – 4.20 pm	Role of Law in the Winds of Change – Perspective of Commercial Law <i>Prof. Naazima Kamardeen, Head, Department of Commercial Law</i>
4.20 pm – 4.30 pm	Cultural Performance
4.30 pm – 5.00 pm	Keynote Address by Chief Guest <i>Prof. G. L. Peiris</i>
5.00 pm – 5.15 pm	Address by Guest of Honour <i>Hon. Justice Gamini Amarasekera</i>
5.15 pm – 5.25 pm	Distribution of Tokens of Appreciation
5.25 pm – 5.35 pm	Launch of Publications <i>Sri Lanka Journal of International Law (Volume 30, Issue 2) by the Department of Public and International Law</i> <i>Abstract Proceedings</i>
5.35 pm – 5.45 pm	Vote of Thanks <i>Dr. Akalanka Thilakarathna</i>
5.45 pm – 6.00 pm	Networking and Refreshments

INTRODUCTION TO THE KEYNOTE SPEAKER

Professor G. L. Peiris

*Emeritus Professor of Law
Former Vice-Chancellor
University of Colombo
Sri Lanka*



Professor Gamini Lakshman Peiris is widely considered to be the most influential legal scholar that Sri Lanka has produced since independence. His writings on Criminal Law, Property Law, Law of Evidence, Constitutional Law and Administrative Law have dominated these areas for more than fifty years. Even today, it is difficult to find a law student, a lawyer or a judge who has not benefited from his work in their study of law.

Professor Peiris entered the Faculty of Law of the University of Ceylon and obtained the Degree of Bachelor of Laws with First Class Honors, winning many awards and prizes, including the Gate Mudliyar Edmond Peiris Award. Having been absorbed into the Staff of the Faculty of Law and being the proud winner of the prestigious Rhodes scholarship, he proceeded in 1968 to the University of Oxford, UK, to read for the D.Phil. Degree. He was awarded the D.Phil. Degree by Oxford University in 1971 and also earned the Degree of Doctor of Philosophy from the University of Colombo in 1974. Professor Peiris has authored more than ten books and his research articles, numbering more than thirty, are published in renowned refereed journals worldwide. He held Fellowships at the Universities of Oxford, Cambridge and London and was also invited by world-renowned universities from various countries to deliver Orations in the name of distinguished personalities and events. Professor Peiris was appointed as the Vice-Chancellor of the University of Colombo in 1988 and served in that capacity until 1994. As the Vice-Chancellor, he gave importance to research and promoted sustained research among academics. He also constantly encouraged university teachers to broaden the dissemination of knowledge to include wider sections of society. It is undisputed that only a few Sri Lankan academics have had the privilege of shaping the laws and policies of our country as Professor Peiris has done over the years, with utmost decency and integrity. The Faculty of Law of the University of Colombo is immensely honored to have Professor G. L. Peiris as the Keynote Speaker for this year's International Research Conference.

LIST OF ABSTRACTS

Polluter Pays in Practice: Evolving legal boundaries in environmental liability in Sri Lanka	
<i>D. S. E. U. S. Liyanage</i>	223
Responding to the child's need for the father's presence through Sri Lankan labor law	
<i>R. Wijeyesekera</i>	224
A reflection on the legality of restraining clauses in contracts of employment	
<i>A. Sarveswaran</i>	225
Human tissue donation in Sri Lanka: Legal, ethical and regulatory challenges	
<i>B. M. Munasinghe</i>	226
Patients' right to safe medication: Legal framework relating to private pharmacy practices in Sri Lanka	
<i>J. Jeyarednam</i>	227
Do we possess the healthy deck to make them confident to stand: The child and the Sri Lankan constitution	
<i>T. K. Thanikumar</i>	228
Exploring the impact of unpaid domestic and care work on academic productivity and career advancement in Sri Lankan universities	
<i>R. Wijeyesekera, K. A. A. N. Thilakarathna</i>	229
Wisdom of outlawing <i>sub judice</i> statements in Sri Lanka: A comparative study with the United States of America	
<i>T. Nanayakkara</i>	230
Reimagining the Law of Delict in Sri Lanka: The need for a coherent common law tradition	
<i>V. K. Ahamed</i>	231
Clinical legal education in the state university system of Sri Lanka: Challenges and insights	
<i>P. Bandaranayake</i>	232
Rethinking rights and reform of mental health law in Sri Lanka: A comparative analysis	
<i>K. A. U. I. Wijayarathna</i>	233
Transnational enforcement and recognition of Sri Lankan judicial determinations: A comparative analysis	
<i>G. Huruggamuwa</i>	234

Ethical and legal implications of Sri Lanka’s guideline-based approach to assisted reproductive technologies	
<i>D. Abeyrathna</i>	235
Too familiar to ignore, but too different to tolerate: The role of the law in regulating emotional expression by robots to mitigate the harmful effects of robot deception	
<i>N. Gunawardena</i>	236
Affording accountability to non-state actors: A comparative study with special reference to Sri Lanka	
<i>E. G. S. S. Ranathunga</i>	237
A comparative study on parole as a post-conviction correction mechanism with special reference to Sri Lanka	
<i>M. A. D. S. J. S. Niriella</i>	238
Commissions of inquiry in Sri Lanka: A critical analysis of the dual statutory framework and its role in democratic governance	
<i>M. Harankaha, K. A. A. N. Thilakarathna, M. G. H. P. Weerasinghe</i>	239
Reimagining academic integrity framework in the age of AI: An ethical approach	
<i>C. L. Akurugoda</i>	240
Unravelling the jurisdiction of Provincial High Courts under Article 154 P (4) of the Constitution: A case law review	
<i>S. Puwanitha</i>	241
Juridical self and judicial review	
<i>I. Arachchi</i>	242
Limits of the global climate governance: An assessment of the Kyoto, Paris, and post-Paris eras	
<i>M. J. Christina</i>	243
Silent skies, shattered borders: Transboundary missiles, airspace sovereignty, and Sri Lanka’s legal readiness in a changing strategic landscape	
<i>L. A. R. R. Perera</i>	244
Regulating campaign finance and ensuring electoral fairness: An analysis of the Regulation of Election Expenditure Act No. 3 of 2023 of Sri Lanka	
<i>S. Susarithaa</i>	245
‘The <i>Parthenon</i> Equilibrium’: The tripartite architectural structure of the International Humanitarian Law	
<i>K. Amarasinghe</i>	246
Significance of international law in legal research: A Third World approach to the transferability of international legal standards to domestic contexts	
<i>W. Seneviratne, K. A. A. N. Thilakarathna</i>	247

From formality to substantive justification: Evolving standards on judicial accountability and reasoned decision making in Sri Lanka	
<i>U. A. T. Udayanganie</i>	248
A legal analysis on the treatment of cultural property: Special reference to the 1638 Westerwolt Treaty in light of the contemporary Dutch restitution process	
<i>D. Madhushan, N. Kamardeen, W. Veraart, N. Dewasiri</i>	249
Recognising economic and moral rights of performers (singers) in Sri Lanka: Lesson from the European Union and India	
<i>D. M. R. A. Dissanayake</i>	250
Profiting from the digitalisation of colonial cultural objects: A comparison of British and Dutch museum practice	
<i>N. Kamardeen, T. Nanayakkara</i>	251
Reforming the legal framework pertaining to the electricity sector in Sri Lanka: A critical appraisal	
<i>K. H. Geeganage</i>	252
Impact of stringent interpretation of tax provisions on funded research in universities: A case study from Sri Lanka	
<i>P. K. M. Nanayakkara, N. Kamardeen, D. Pathirana</i>	253
Strengthening personal data protection law regime in Sri Lanka: A critical perspective	
<i>N. S. Punchihewa</i>	254
Exclusion clauses in insurance contracts in Sri Lanka: The need for law reform	
<i>W. M. N. A. Dinendra</i>	255
Beyond borders and barriers: Holding Multinational Corporations criminally liable for human rights violations in host nations	
<i>W. I. Nanayakkara</i>	256

Polluter Pays in Practice: Evolving legal boundaries in environmental liability in Sri Lanka

D. S. E. U. S. Liyanage

Department of Private and Comparative Law, Faculty of Law, University of Colombo, Sri Lanka

Environmental liability occupies a distinct position within the law, as it transcends the confines of personal injury and property damage to encompass harm to ecosystems and successive generations. Such harm is frequently irreversible and enduring, thereby necessitating engagement with public law considerations, including constitutional protection. In Sri Lanka, strict liability for environmental damage, particularly in cases involving the escape of hazardous substances, derives from the common law doctrine articulated in *Rylands v Fletcher*, rather than from statutory environmental provisions. This doctrine corresponds closely with the internationally recognized Polluter Pays Principle, which has been judicially endorsed in a series of Sri Lankan decisions concerning pollution. In the recent *MV X-Press Pearl* Marine Environmental Pollution Case, the Supreme Court affirmed that the Polluter Pays Principle establishes a standard of absolute liability. The Court further determined that this principle constitutes part of Sri Lanka's common law and extends to non-state actors, including shipowners and insurers. Significantly, the Court exercised its fundamental rights jurisdiction under Articles 17 and 126 of the Constitution to impose such liability, thereby disrupting the conventional divide between public and private law. This study undertakes a critical analysis of the rationale underlying this judicial departure from the traditional dichotomy in determining absolute environmental liability. Through a qualitative examination of the *MV X-Press Pearl* decision alongside selected earlier precedents, it evaluates the emerging judicial approach and its broader implications for legal reform. The findings are intended to inform policymakers in the development of future legislative and regulatory frameworks.

Keywords: *Polluter pays, Strict liability, Absolute liability, MV X-Press Pearl case*

Responding to the child's need for the father's presence through Sri Lankan labor law

R. Wijeyesekera

Department of Private and Comparative Law, Faculty of Law, University of Colombo, Sri Lanka

The world of work is not devoid of parent-child relationships and corresponding obligations. Legal systems around the world responds to these human needs by recognizing, *inter alia*, parental leave' entitlements of employees. Based on different grounds unique to each legal system, such leave is communicated as 'maternity', 'paternity' or 'parental'. Sri Lanka mandates 'maternity leave' female employees at an optimal level for both the public and private sectors, enabling recovery after childbirth, maternity care during pre-and post-natal periods, including the facilitation of breast-feeding. Yet, only very nominal paternity leave is granted to male employees. Among the many signals this nominal paternity leave sends, such as entrenching gender norms and stereotypes relating to childcare, it undermines the child-father relationship denying both their rights as a child and as a father. This shows the law's reluctance to recognize the importance of fatherhood and paternal care during the early stages of a child's life, at a similar weight it attaches to motherhood and maternal care. This denies Sri Lankan children their father's active involvement in their early life, while discriminating against fathers employed in state and private sectors. At a significant juncture where the country is gearing towards reviewing the existing employment laws with a view to introducing a comprehensive Labor Code, this paper argues for enhanced legal provision for paternity leave through a comparative analysis of the legal framework of neighboring India. A doctrinal method is used to draw insights from Indian law and jurisprudence where paternity leave has been rationalized from a child rights perspective. International standards and comparative law are used as benchmarks to ensure enhanced consistency with the best interests of every child without discriminating based on the legal status of the parent-child relationship. The paper recommends legal and institutional reforms that ensure the best interests of Sri Lankan children by duly accommodating fatherhood in the Sri Lankan world of work.

Keywords: *Paternity leave, Child rights, Employment law*

A reflection on the legality of restraining clauses in contracts of employment

A. Sarveswaran

Department of Private and Comparative Law, Faculty of Law, University of Colombo, Sri Lanka

In the modern employments, it becomes increasingly important to the employers to protect their confidential information, insider knowledge, trade secrets, proprietary interests and to prevent solicitation of trade associates. Therefore, employers incorporate restraining clauses in contracts of employment. An employer could incorporate a restraining clause that favours him, and the employee is not in a position to resist it because of his unequal bargaining power. Such restraining clauses may become a violation of freedom of employment of the employee and violation of public policy. In this conundrum, the research problem is whether incorporation of a restraining clause in a contract of employment is lawful. The main objective of the research is to analyze lawfulness of a restraining clause in a contract of employment. The research is qualitative in nature, based on the analysis of legal materials, in particular, judicial decisions and statutory provisions. A clause which restrains an employee during employment is generally lawful as trust, confidence and fidelity are expressed or implied conditions of certain employments. A clause which restrains an employee in post-employment should be an expressed one. The clause is lawful if it is fair, reasonable and not in violation of public policy. The recent judgment of the Indian Supreme Court in *Vijaya Bank* case justifies a restraining clause/restrictive covenant which restrains an employee from resigning within a specified period and imposes a liquidated damage for default. In this case, the Indian Supreme Court justified the clause considering the expensive and time-consuming recruitment process and the impact of early resignation on smooth functioning of the workplace. In India, the legal validity of a restraining clause is tested on the touchstone of Section 27 of the Contract Act. It is suggested to amend the Unfair Contract Terms Act of Sri Lanka to expressly provide that a restraining clause in a contract of employment is void unless it is fair and reasonable.

Keywords: *Clause, Employment, Lawfulness, Reasonable, Restraining*

Human tissue donation in Sri Lanka: Legal, ethical and regulatory challenges

B. M. Munasinghe

Department of Private and Comparative Law, Faculty of Law, University of Colombo, Sri Lanka

Human tissue donation plays a vital role in modern medicine, enabling various lifesaving and life enhancing interventions. However, the existing legal and policy framework governing tissue donation in Sri Lanka remains underdeveloped and lacks coherence, leading to significant regulatory and ethical challenges. This research uses a doctrinal methodology to critically examine Sri Lanka's statutes, case law, and related legal instruments, with special reference to the Transplantation of Human Tissues Act and its subsidiary legislation. The research also incorporates secondary sources, such as scholarly commentary, policy papers, and the UN regulatory framework, to provide a wider comparative perspective. The findings highlight number of systemic shortcomings, including the absence of a centralized regulatory body, outdated statutory provisions, inadequate procedural safeguards concerning informed consent, and insufficient enforcement mechanisms to ensure ethical compliance. Infrastructural limitations, such as the lack of a national tissue bank system, insufficiently trained personnel, and weak inter-agency coordination, further hinder the effective implementation of the existing legal framework. Personal beliefs shaped by cultural and religious traditions, together with a general lack of awareness, contribute to public reluctance, posing a challenge to advancing voluntary and ethically sound tissue donations. To address these challenges, this study recommends substantial legal and institutional reforms, including the establishment of a centralized oversight authority, legislative reform to clarify consent procedures and donor protections, and the introduction of public education campaigns to foster greater societal engagement and trust in the donation process.

Keywords: *Human tissue donation, Regulatory framework, Transplantation of Human Tissues Act, Informed consent, Sri Lanka*

Patients' right to safe medication: Legal framework relating to private pharmacy practices in Sri Lanka

J. Jeyarednam

Department of Private and Comparative Law, Faculty of Law, University of Colombo, Sri Lanka

The right of patients to safe and quality medication is a fundamental aspect of the right to health recognized under international law. World Health Organization (WHO) emphasizes safe medication practices as a core element of health systems. Pharmacies are part of an integrated medical structure that provides healthcare services. Sri Lanka has an enriched health care system including both public and private sector. The National Medicines Regulatory Authority Act, No. 5 of 2015 is the main piece of legislation that aims to ensure the availability of safe, effective, and affordable medical products in Sri Lanka. It established the National Medicines Regulatory Authority (NMRA) to oversee the regulation, registration, licensing, and control of medicines, medical devices, and borderline products. However, successful implementation of private pharmacy regulations appears to be uncertain. Also, there is no explicit guarantee for the right of patients for safe medication or the right to health under the Sri Lankan constitution. Although, private pharmacies play a vital role in a healthcare system, concerns have emerged about the quality of medicines dispensed, ethical practices, regulatory oversight, protection of patients' rights, counterfeiting, inadequate public awareness and overall patient care in Sri Lanka. This study examines the laws governing medication dispensing by private pharmacies in Sri Lanka, focusing on patients' right to safe medication as an integral part of the right to health under Article 12 of the International Covenant on Economic, Social and Cultural Rights (ICESCR, 1966). It includes a comparative analysis of international law and Sri Lankan legislation to assess compliance and identify gaps. The study further evaluates key challenges to safe medication, including existing legal frameworks, implementation gaps, the absence of constitutional guarantees, and the role of professional ethics and regulatory oversight. Employing doctrinal research method, the analysis draws on a comprehensive review of primary and secondary sources. Finally, this paper proposes legal and policy reforms aimed at strengthening patient rights, enhancing pharmacy regulation, and improving access to safe medicines with reference to relevant legal and institutional protections in India.

Keywords: *Right to health, Safe medication, Counterfeiting, Private pharmacies, Regulatory oversight*

Do we possess the healthy deck to make them confident to stand: The child and the Sri Lankan constitution

T. K. Thanikumar

Department of Private and Comparative Law, Faculty of Law, University of Colombo, Sri Lanka

Constitution is the *grund norm* of modern democracies. This has, in reality, led the United Nations Charter on the Rights of the Child (UNCRC) to obligate state parties to move to constitutionalize child rights for better manifestation alongside other supplementary measures. To achieve this, state parties around the globe have embraced two unique approaches referred in this paper as ‘explicit constitutionalization’ and ‘implicit constitutionalization’ of child rights. The paper argues that the Second Republican Sri Lankan Constitution has embraced implicit constitutionalization of child rights within the legal culture that has historically viewed the child as a passive object under parental authority. The study examines the decisions of the appellate courts on child – related issues and emphasize on the reasons why the judicial activism and legal resilience of the Sri Lankan system have thus far failed to provide adequate legal and institutional architecture to treat the child as an autonomous rights holder. The paper elucidates that the judicial activism that the country has witnessed is ad – hoc, despite the interventions being thoughtful and aimed at specific child issues. To strengthen the relationship between the child and Sri Lankan Constitution, the paper proposes for the recognition of cardinal principles of child rights – right to life, right to participation, right to survival and development and best interest of the child – into the Sri Lankan Constitution, thereby establishing all of them as the guiding tenets for child-related matters in the country by utilizing lessons from Indian and South African constitutional jurisprudence.

Keywords: *Child rights, Constitution, Uncork, Rights-based approach*

Exploring the impact of unpaid domestic and care work on academic productivity and career advancement in Sri Lankan universities

R. Wijeyesekera¹, K. A. A. N. Thilakarathna²

¹*Department of Private and Comparative Law, Faculty of Law, University of Colombo, Sri Lanka*

²*Department of Public and International Law, Faculty of Law, University of Colombo, Sri Lanka*

Unpaid care and domestic work (UCDW) consume significant time and energy, yet remain largely undervalued and rarely recognized within economic or institutional frameworks. Deeply entrenched gender norms, coupled with family expectations and obligations, disproportionately assign this burden to women, restricting their right to development and equal participation in society. Globally, UCDW has been recognized as a structural barrier to women's access to employment, career advancement, and leadership roles. A 2017 study found that over 67 percent of Sri Lankan women of working age identified UCDW as the primary reason for their inability to participate in paid work, despite their willingness to do so. The higher education sector offers a telling example of this imbalance. For women academics, the multidimensional nature of UCDW including household management, caregiving responsibilities, and cultural expectations limits research productivity, delays promotions, and reduces representation in leadership, thereby constraining their professional growth and weakening the capacity of Sri Lanka's higher education system to fully harness its talent. While universities have adopted certain mechanisms such as flexible work schedules, maternity leave, and limited childcare facilities, these measures remain inadequate, unevenly implemented, and insufficient to address systemic inequities. Such gaps not only compromise the professional growth of women academics but also undermine the ability of Sri Lanka's tertiary education system to fully utilize the skills and contributions of its workforce. This shortfall is especially critical during the economic crisis, when maximizing human capital and closing the gender gap are vital. This study, employing qualitative methods and primary data collected from academic staff, investigates the extent and impact of UCDW within Sri Lankan universities. It further proposes evidence-based legal, policy, and institutional reforms, aligned with Sustainable Development Goal 5.4, which calls for recognizing and valuing unpaid care and domestic work, as well as international best practices, to recognize and redistribute UCDW, thereby advancing gender equality and strengthening women's participation in academia.

Keywords: *Unpaid care and domestic work, Gender equality and higher education*

Wisdom of outlawing *sub judice* statements in Sri Lanka: A comparative study with the United States of America

T. Nanayakkara

Department of Private and Comparative Law, Faculty of Law, University of Colombo, Sri Lanka

This article analyses the concept of *sub judice* (under the consideration of a judge) in Sri Lanka, along with how the concept originated and evolved to its current state. Through an examination of the Contempt of Court Act and case law in Sri Lanka, it finds that statements made *sub judice* can be held to be in contempt of court. This article contrasts this state of the law with that of the United States of America (USA) which does not recognize *sub judice* statements to be in contempt of court, to the extent in Sri Lanka. The methodology of this article is comparative, doctrinal and normative. The article draws upon a recent case study surrounding two star-studded actors in Hollywood who sued each other, one for sexual harassment and the other on a counter suit of defamation. Based on public interest in the trial and conversations online, the case saw parties amend their petitions based on findings of interesting internet sleuths. The article attributes the allowance of such a practice to the wide first amendment freedoms of expression in the USA. The article draws on case law in Sri Lanka which has limited recognition that similar statements would be in contempt of court and prejudice litigants before a verdict is pronounced in court. However, the article concludes that most *sub judice* pronouncements so far have been limited to matters taken up by multiple judicial and quasi-judicial bodies at a time. Major findings reveal that apart from specific situations where statements *sub judice* may be inappropriate, prohibiting larger public conversations on matters under judicial consideration may stifle vital public debate and participation on important matters of governance. The article tentatively concludes that the law in Sri Lanka provides for a limited interpretation of *sub judice* and advocates for such an approach in order to allow for a fertile marketplace of ideas in public spaces about matters under judicial consideration, as long as the expressions be made in good faith.

Keywords: *Sub Judice, Contempt of Court, Marketplace of ideas, Public debate*

Reimagining the Law of Delict in Sri Lanka: The need for a coherent common law tradition

V. K. Ahamed

Department of Private and Comparative Law, Faculty of Law, University of Colombo, Sri Lanka

Sri Lanka's law of delict, though rooted in Roman Dutch law, has evolved under the influence of English and South African authorities as well as local traditions. This layered development has produced a fragmented and uncertain body of doctrine, often marked by inconsistency in the reception and application of foreign sources. A coherent and locally grounded framework is therefore needed to maintain clarity and predictability in civil justice. This paper argues for a principled approach that reflects Sri Lankan values and institutional realities, supported by a consistent judicial method. Using Aquilian liability as its focus, it adopts a qualitative doctrinal method with selective comparative analysis of English and South African sources. It contrasts the restrictive approach in *Priyani Soyza v Arsecularatne* with the more progressive *Karunanayake v Mannapperuma*, which affirmed the adaptability of the *lex Aquilia*. These cases highlight both the potential and the limits of judicial development in the absence of structured doctrine. The study proposes a framework organized around the elements of wrongful conduct, fault, causation, and damage, with defines and justifications clearly defined. Fault remains the general basis of liability, while strict liability should be confined to carefully delimited categories. Harm should include patrimonial loss, limited non-pecuniary damages, and pure economic loss subject to principled constraints, with causation assessed through foreseeability and fairness. For reform, the paper recommends a pragmatic middle path that combines partial codification with restatement-style guidance and stronger doctrinal scholarship. Priority areas include clarifying the boundary between fault and non-fault liability, expanding damages for non-pecuniary loss in professional negligence, and providing structured principles for the quantification of damages. Taken together, these measures would foster a principled, coherent, and context-sensitive law of delict while preserving continuity with Roman-Dutch foundations.

Keywords: *Delict, Aquilian action, Roman-Dutch law, English law, Judicial borrowing, Indigenous common law*

Clinical legal education in the state university system of Sri Lanka: Challenges and insights

P. Bandaranayake

Department of Private and Comparative Law, Faculty of Law, University of Colombo, Sri Lanka

Clinical Legal Education (CLE) integrates theoretical legal education with practical training through supervised client interactions to strengthen law students' readiness for professional practice. Despite global recognition of its value in fostering competencies such as reflective practice, ethical reasoning, critical thinking, and employability, CLE remains marginal in Sri Lanka. The main objective of this research is to examine the institutional barriers that have hindered the systematic integration of CLE into state university law curricula in Sri Lanka. Therefore, the research aims to identify existing curricular gaps, analyse the challenges that sustain them, and propose strategies informed by the South African model of clinical education. South Africa is selected as the comparative jurisdiction because they have incorporated CLE within their public university system, facing resource constraints similar to those in Sri Lanka. Their experience demonstrates how reflective practice, community engagement, and professional ethics can be integrated despite institutional limitations. The study adopts a qualitative method based on primary and secondary resources. A quantitative approach is reserved for future research, once the basic institutional map of CLE in Sri Lanka is available. It is discovered that institutional barriers such as limited supervision capacity and insufficient funding continue to obstruct CLE's institutionalisation. To address these challenges, it proposes building partnerships with the legal profession, adopting technology-assisted clinical education, and developing targeted resource-allocation strategies. The research concludes that adapting educational frameworks inspired by South Africa's successful practices offers a credible pathway for Sri Lankan universities to strengthen professional training and align graduates with contemporary legal and societal demands.

Keywords: *Clinical Legal Education, Curriculum reform, Institutional integration, South Africa, Sri Lanka*

Rethinking rights and reform of mental health law in Sri Lanka: A comparative analysis

K. A. U. I. Wijayarathna

Department of Private and Comparative Law, Faculty of Law, University of Colombo, Sri Lanka

This paper critically examines the legal regulation of mental health admissions in Sri Lanka, with a specific focus on the doctrine of legal capacity and its relevance to involuntary detention and treatment under the Mental Diseases Ordinance No. 1 of 1956. Although mental health law sits at the intersection of care, control, and human dignity, the Sri Lankan framework has remained anchored in colonial-era provisions that neither define legal capacity nor provide safeguards for individuals facing compulsory admission. The central legal issue examined is the absence of a statutory test for legal capacity, which undermines procedural safeguards, consent, and individual autonomy in mental health decision-making. Drawing on rights-based standards, including the United Nations Convention on the Rights of Persons with Disabilities (CRPD), this paper demonstrates how the prevailing legal regime fails to uphold the presumption of capacity and does not provide mechanisms for supported decision-making or independent review. Through doctrinal and comparative legal analysis, and with reference to reforms in India, the United Kingdom, and South Africa, the paper argues that the current legal framework falls short of both constitutional and international human rights obligations. Particular attention is paid to the need for a clear legal test for decision-making capacity, procedural fairness in detention, and the recognition of autonomy-enhancing alternatives. In reimagining legal standards for capacity and involuntary admission, the study proposes a rights-based framework that incorporates statutory definitions, regular judicial oversight, and non-discriminatory access to mental health care. While the study is limited to doctrinal and comparative analysis without empirical data, it contributes to contemporary debates on the evolving role of law in advancing mental health rights. It concludes that meaningful reform is essential to align national law with international standards and ethical imperatives.

Keywords: *Mental health law, Legal capacity, involuntary admission, Human rights, Law reform*

Transnational enforcement and recognition of Sri Lankan judicial determinations: A comparative analysis

G. Huruggamuwa

Department of Private and Comparative Law, Faculty of Law, University of Colombo, Sri Lanka

This study examines the legal and doctrinal challenges Sri Lanka faces in securing recognition and enforcement of its judicial determinations abroad. It considers the enforceability and practical application of Sri Lanka's legislation on the Reciprocal Recognition of Foreign Judgments, assessing both its scope and its limitations in practice. Core private international law principles such as jurisdictional competence, judicial comity, reciprocity, finality of judgments, and forum public policy are analyzed to understand the conditions under which foreign courts may recognize Sri Lankan determinations. A comparative analysis highlights divergent approaches: jurisdictions such as the United Kingdom and Singapore provide statutory mechanisms for direct enforcement of Sri Lankan determinations owing to reciprocal arrangements, whereas countries like India and the United States rely on domestic common-law principles. Absent a treaty or reciprocity, Sri Lankan determinations often require re-litigation or fresh suits to be enforced. The study further underscores the absence of any multilateral or bilateral treaty guaranteeing cross-border effectiveness, noting that Sri Lanka is not party to any operational judgment-enforcement convention. These shortcomings exacerbate uncertainty and enforcement barriers, as foreign courts default to local law scrutiny such as ensuring procedural fairness and avoiding conflicts with public policy before recognition. To address these gaps, the paper proposes reforms, including Sri Lanka's accession to international frameworks (such as the Hague Judgments Convention) and the negotiation of bilateral agreements with key jurisdictions, particularly within the Commonwealth. Such reforms would foster greater harmonization, predictability, and effectiveness in the transnational enforcement of Sri Lankan judicial determinations.

Keywords: *Private international law, Reciprocal recognition, Judicial determinations, Sri Lanka, Transnational enforcement*

Ethical and legal implications of Sri Lanka's guideline-based approach to assisted reproductive technologies

D. Abeyrathna

Department of Private and Comparative Law, Faculty of Law, University of Colombo, Sri Lanka

Sri Lanka's recent strides in assisted reproductive technologies (ART), including the formulation of ministerial guidelines and establishing its first government hospital-based sperm bank, mark a significant shift in the reproductive healthcare landscape. However, these developments have occurred without a corresponding legislative framework. Without binding laws, ART in Sri Lanka is governed solely by non-enforceable administrative guidelines, circulars, and professional discretion. This paper argues that a guideline-based approach, while useful as a transitional measure, is insufficient to uphold ethical standards, provide legal clarity, and protect the rights of all stakeholders involved in ART, particularly donors, surrogates, intended parents, and children born through these technologies. Drawing on core bioethical principles, the paper explores key ethical and legal risks arising from the absence of binding legislation, examines existing impediments to legislating on ART, and discusses ways to address these challenges. The study further engages in a comparative legal analysis with India, which transitioned from an unregulated ART market to a tightly controlled legal regime under the Surrogacy (Regulation) Act, 2021 and the Assisted Reproductive Technology (Regulation) Act, 2021. The significance of this study lies in its contribution to the emerging discourse on reproductive governance in Sri Lanka, providing critical insights at a significant moment of policy reform. Employing a qualitative legal-ethical methodology, the study integrates doctrinal analysis of Sri Lanka's ART guidelines with normative ethical evaluation and comparative legal reasoning. The paper concludes that Sri Lanka must move beyond guidelines and adopt a rights-based, context-sensitive legal framework to ensure ethical accountability, legal certainty, and the best interests of the child.

Keywords: *ART, Guideline-based approach, Donors, Surrogates, Intended parent*

Too familiar to ignore, but too different to tolerate: The role of the law in regulating emotional expression by robots to mitigate the harmful effects of robot deception

N. Gunawardena

Department of Private and Comparative Law, Faculty of Law, University of Colombo, Sri Lanka

A long-standing argument for why robots will never “take over” and pose an existential threat to humans is that we will always have a “kill switch” to deactivate them. But what if a robot manipulates us into not flipping that switch? Recent studies show that robots are capable of deception. Despite ongoing debates regarding the specific nature of this capability, such as whether it is indicative of a theory of mind or consciousness, robot deception (RD) can be “intentional” from at least a behaviorist point of view. The expression/mimicking of emotions is one of the most effective ways in which robots engage in deception. This poses unique ethical and regulatory challenges because it is not ostensibly malicious or threatening. We are already experiencing the harmful effects of RD in our daily lives, particularly the risks associated with over-reliance. However, RD can also be beneficial in certain use cases. This paper addresses the question of how emotional expression by robots should be regulated to mitigate the harmful effects of robot deception. The EU Artificial Intelligence Act (AIA) currently establishes the most comprehensive framework for the regulation of robots and provides a starting point to assess the efficacy of contemporary regulatory standards. Thus, this paper will involve a conceptual/normative analysis of RD combined with a doctrinal analysis of the AIA. Section 2 begins by conceptualizing RD; analyzing its nature, how it manipulates humans, and the harm it can cause. Section 3 evaluates the applicable provisions of the AIA and reveals that the harm caused by expressive robots is being underestimated. Therefore, Section 4 proposes expanding the definition of “harm” to include long-term structural harm and classifying robots based on their different deceptive capabilities. This paper also considers the possibility of imposing design-related restrictions to “trap” expressive robots within the uncanny valley.

Keywords: *Robot deception, Emotional expression by robots, Artificial Intelligence, EU AI Act, Over-reliance on AI*

Affording accountability to non-state actors: A comparative study with special reference to Sri Lanka

E. G. S. S. Ranathunga

Department of Private and Comparative Law, Faculty of Law, University of Colombo, Sri Lanka

Along with the emergence of universal human rights protection for every human being after the conclusion of World War II, the obligation to protect human rights was seen solely as a duty of the State, without consideration of the obligations that may be afforded to non-State actors (NSAs). With the emergence of influential corporate bodies like Multinational Corporations (MNCs) and Transnational Corporations (TNCs) and the presence of armed NSAs, the State-centric approaches towards protecting human rights seem insufficient. Even though there are international, regional, and domestic mechanisms available for affording human rights obligations to NSAs, their obligations are strictly limited to the extent of their capacity, context, and commitments. Although these initiatives can have a spillover effect on the world as a whole, the enforcement mechanisms, binding obligations, supervisory functions, and robust grievance systems are virtually absent. Besides, the mere presence of certain mechanisms does not guarantee protection unless they are enforced with meaningful consequences for the stakeholders. Against this backdrop, the author will limit the scope of this paper to the study of the special protections afforded against violations of human rights by corporate bodies in Sri Lanka, with a view to formulating a grounded corporate accountability framework. Even though some of these violations are resolved through judicial interventions, in reality, most of these violations are backed or instigated by the State itself or often go unnoticed. Therefore, this study recommends emancipating human rights protection from State-centric arrangements and developing a decentralized system for the protection of human rights, as the former is bound to fail in regulating complex affairs of the corporate world. Further, creating an international framework and judicial bodies to adjudicate these corporate NSAs to hold corporate entities directly liable on a global scale will create an opportunity to afford liabilities directly against them. Such liabilities will act as a check on the diverse conducts of corporations and bring the victims proper reparation for damages, which will be inclusive of restitution, compensation, rehabilitation, satisfaction, and guarantees of non-recurrence.

Keywords: *Multinational and Transnational Corporations, Non-State Actors, Corporate accountability, International human rights law, State vs. Non-State obligations*

A comparative study on parole as a post-conviction correction mechanism with special reference to Sri Lanka

M. A. D. S. J. S. Niriella

Department of Public and International Law, Faculty of Law, University of Colombo, Sri Lanka

Parole, as an instrument of conditional release, has emerged as a critical post-conviction correction mechanism in modern criminal justice systems, aimed not only at reducing prisons' overcrowding, but also at facilitating the rehabilitation and reintegration of prisoners into society to reach decreasing reconviction and recidivism. However, the efficacy of parole in achieving these objectives differs substantially across jurisdictions. This study adopts a doctrinal and comparative research method coupled with a critical analysis of the framework relating to parole systems in Sri Lanka. The study also examines parole in countries like Canada, UK and USA, in reducing reconviction and recidivism through the philosophy of rehabilitation and reintegration. The background to this study is rooted in the global shift from punitive incarceration to rehabilitative correctional models, which increasingly recognize the need for community reintegration. Despite this trend, Sri Lanka does not have a parole system and the prevailing early release systems employed by the Department of Prisons remain at an infant stage, lacking consistency, rehabilitative orientation, and procedural transparency. This study attempts to achieve four objectives: to assess parole concept in the criminal justice system; to examine the legal, procedural, and institutional framework governing parole in Sri Lanka; to compare this framework with the parole systems in Canada, the UK and the USA which represent mature, risk-based, and reintegration-oriented models; and to evaluate the role of parole in reducing reconviction and recidivism through rehabilitation and reintegration in Sri Lanka. The findings reveal that developed countries incorporate risk-based release models and robust supervision mechanisms, with integrated support systems. In contrast, Sri Lanka's early release model lacks coherence and rehabilitation-centric infrastructure to include formalized criteria for release, post-release monitoring, and institutional capacity. The study concludes that for parole to serve as an effective tool of reintegration and crime reduction, Sri Lanka must introduce a structured, transparent, and rehabilitative parole system, harmonized with international standards. Legal reform and institutional strengthening are essential to achieving this transformation.

Keywords: *Parole, Post-conviction correction, Recidivism, Comparative criminal justice*

Commissions of inquiry in Sri Lanka: A critical analysis of the dual statutory framework and its role in democratic governance

M. Harankaha¹, K. A. A. N. Thilakarathna², M. G. H. P. Weerasinghe³

¹*Department of Commercial Law, Faculty of Law, University of Colombo, Sri Lanka*

²*Department of Public and International Law, Faculty of Law, University of Colombo, Sri Lanka*

³*Faculty of Law, University of Colombo, Sri Lanka*

This research paper provides a critical examination of Sri Lanka's two-fold statutory framework relating to commissions of inquiry, the Commissions of Inquiry Act No. 17 of 1948 and the Special Presidential Commissions of Inquiry Law No. 7 of 1978. Under these two instruments, Sri Lanka has seen the creation of a number of ad hoc investigative bodies under President's warrant, to inquire into matters of national significance and controversy, including high-end corruption, maladministration, political victimization, and systematic abuses of power involving public figures and public officers. Employing a qualitative methodology based on doctrinal analysis and supported by case-based research, this study explores the legal foundations and coercive powers of both types of commissions, examining how these elements shape their role in Sri Lanka's governance framework. Despite both frameworks bearing resemblances with each other, a comparative analysis of corresponding provisions of both legislations mentioned above reveals that they differ fundamentally in their structure, powers and effect. While the commissions under 1948 Act function primarily as non-binding fact-finding bodies with procedural flexibility and broader public engagement, the commissions under 1978 Law exercise quasi-judicial power, with more coercive investigative authority, and the power to impose civic disabilities, coupled with ouster clauses preventing judicial review of the commissions' findings. The paper explores the inherent structural deficiencies and procedural limitations that undermine the effectiveness of these mechanisms, with a special focus on the judiciary's attitude towards scrutinizing the Special Presidential Commissions of Inquiry. Overall, this study attempts to highlight the important role of these institutions as a means of a complementary mechanism which promotes the democratic governance, and transparency; crucial in restoring public trust and effectuating justice in Sri Lanka's transitional economic, political and constitutional landscape.

Keywords: *Commissions of inquiry, Accountability mechanisms, Quasi-Judicial powers, Democratic governance*

Reimagining academic integrity framework in the age of AI: An ethical approach

C. L. Akurugoda

Department of Public and International Law, Faculty of Law, University of Colombo, Sri Lanka

The proliferation of artificial intelligence (AI) such as generative tools like ChatGPT, has resulted in their unprecedented use in everyday life. While these tools have proven to be useful, efficient and user-friendly appealing to many fields, they have also arguably created a disruptive impact on academia to a certain extent, challenging universities to rethink their traditional understanding of academic integrity. In particular, the transformation involving AI has compelled state universities in Sri Lanka to reimagine the notions of authorship, originality and academic misconduct and take initiatives to reform their existing academic integrity frameworks. In this context, this library-based, doctrinal research paper attempts to propose an ethical approach to reimagining the concept of academic integrity within Sri Lanka's state university system. To this end, the first part of this paper examines the policies adopted by a few selected global universities in response to the pedagogical and ethical implications. Drawing on these policies, this paper identifies their approaches to the responsible use of AI and emerging principles underpinning them. The second part reflects on current gaps in existing academic integrity framework and discusses potential lessons that can be learned from the approaches adopted by selected global universities. Rather than framing AI as a threat to academic integrity, the third part of this paper proposes an ethical approach to respond to this transformation. It suggests that it is time for state universities in Sri Lanka to reimagine academic integrity in light of the modern technological affordances, taking into consideration of their implications on students, assessment design and the role of lecturers. Overall, this paper advocates for an ethical response that promote ethical engagement with AI while upholding core academic values within the system.

Keywords: *Academic integrity, Artificial Intelligence, Ethical approach, Higher education*

Unravelling the jurisdiction of Provincial High Courts under Article 154 P (4) of the Constitution: A case law review

S. Puwanitha

Department of Public and International Law, Faculty of Law, University of Colombo, Sri Lanka

Article 154 P (4) of the Sri Lankan Constitution delineates the jurisdiction of the Provincial High Courts (PHCs) in issuing writs. However, the divergent judicial interpretations of this provision - some are devolution-friendly and some are devolution-unfriendly - have created ambiguity in comprehending the jurisdictional scope of PHCs. This study aims to interpret Article 154 P (4) to clarify and categorise the prerequisites for PHCs to exercise writ jurisdiction. This study employs a case law review-based exploratory research and uses qualitative research methods. The findings highlight the judiciary's reliance on two major criteria: (1) the inquiry into the qualitative nature and scope of power exercised by an authority, which contradicts with the objectives of the devolutionary scheme, and (2) the locus from which the power is exercised—whether it emanates from a central authority or a provincial authority. The analysis reveals that judicial interpretations of the jurisdiction of the PHCs have inadequately considered the local nature of the issues, where the expertise of those most familiar with them would be accessible within the PHCs, and failed to align their interpretations with the rationale underlying the introduction of the 13th Amendment. Thus, the study proposes four key prerequisites to determine the jurisdiction of PHCs to adjudicate writ applications by interpreting Article 154 P (4): (1) whether the issue before the PHC deals with any matter in the Provincial Council List; (2) whether the power is derived from any law or provincial statutes; (3) whether the authority was exercised by any persons authorized under any law or statutes; and (4) whether the authority exercised such power within the territorial boundaries. By and large, the study argues that adopting a purposive interpretation of Article 154 P (4) will strengthen the devolutionary objectives of the 13th Amendment and ensure that local disputes are addressed by the institutions best suited to resolve them.

Keywords: *Provincial High Courts, Devolution, Article 154P (4), Writ Jurisdiction, 13th Amendment*

Juridical self and judicial review

I. Arachchi

Department of Public and International Law, Faculty of Law, University of Colombo, Sri Lanka

In this essay, I argue that every law operates on some prior assumptions about the subjects it seeks to govern and these assumptions together constitute the nature of that subject. I call this ‘the juridical self.’ As the current literature seems to treat the law as a phenomenon without a concept of the self on its own, conceptualization of the legal subject relies heavily on other branches of philosophy and even other disciplines. By contrast, the juridical self-rests on the argument that one does not need to look beyond the law to find an extra-legal version of self since the law is capable of providing the nature of its subjects - both fully and exclusively. Accordingly, a direct nexus between law and its subjects is not only possible to be drawn but is also necessary for a nuanced understanding of a legal system. The law in focus here is the judicial review of legislation. I argue that while the Constitutions and legislation encompass two different conceptions of the self, due to the scrutiny of legislation against the Constitution, the judicial review prefers the self under the Constitution over that under the legislation. This dichotomy between the Constitutions and legislation and the precedence of the former over the latter in a system of judicial review - as will be argued - is no coincidence but an upshot of a historic conflict between two rival conceptions of the self namely liberalism and communitarianism. In many modern democracies, the individualistic nature of the liberal self has been given effect to through a Constitutionalized Bill of Rights which – when enforced by the judiciary - is capable of silencing the underlying expectation of a statute that a person governed by it abides by the goals of his community although he may not necessarily agree with them.

Keywords: *Juridical self, Judicial review, Constitution, Liberalism, Communitarianism*

Limits of the global climate governance: An assessment of the Kyoto, Paris, and post-Paris eras

M. J. Christina

Department of Public and International Law, Faculty of Law, University of Colombo, Sri Lanka

Climate change is a global crisis that has demanded successive international legal frameworks, with the Kyoto Protocol and the Paris Agreement representing two significant but divergent approaches. The Kyoto Protocol, pioneered binding emission reduction commitments on developed countries to reduce greenhouse gas (GHG) emissions, but was constrained by limited participation, ambitious objectives, and enforcement challenges. In response, the Paris Agreement sought to address these shortcomings by incorporating a more flexible and inclusive approach within its framework, relying on nationally determined contributions. However, questions remain as to whether the Paris Agreement has been successful in this endeavour. This paper addresses the research problem of evaluating the extent to which the Paris Agreement overcomes the structural and legal constraints of the Kyoto Protocol, while also assessing the emerging practice in the post-Paris era. Using a doctrinal and jurisprudential methodology, the analysis examines the legal architecture of both treaties alongside landmark climate litigation case laws. This paper contributes to the literature by situating the Paris Agreement not only in contrast to Kyoto but also within a post-Paris Agreement context, thereby highlighting the evolving interaction between treaty law and climate litigation in shaping global climate governance. Finally, it will be argued that although the Kyoto Protocol did not achieve complete success, it cannot be regarded as an absolute failure either. Rather, its structural weaknesses were partly addressed through the more flexible and inclusive framework of the Paris Agreement. Nonetheless, given the complex dynamics surrounding its ratification and implementation, more robust and coordinated global efforts are indispensable to address climate change.

Keywords: *Climate change, Kyoto Protocol, Paris Agreement, Global climate governance, International law*

Silent skies, shattered borders: Transboundary missiles, airspace sovereignty, and Sri Lanka's legal readiness in a changing strategic landscape

L. A. R. R. Perera

Department of Public and International Law, Faculty of Law, University of Colombo, Sri Lanka

The rise of transboundary missile strikes, and unmanned aerial vehicles (UAVs) have significantly challenged traditional notions of airspace sovereignty. Recent events, such as Iran's missile launches targeting Israel via third-party airspaces, highlight tensions between established international legal frameworks, rooted in the Chicago Convention of 1944, and contemporary security threats. This paper employs a doctrinal legal research methodology to critically examine the intersection of public international air law, state sovereignty, and emerging aerial technologies. Focusing on Sri Lanka, a strategically located island in the Indian Ocean experiencing growing geopolitical interest from regional powers like China and India, this study assesses the adequacy of its legal and institutional frameworks in addressing potential violations of its airspace. The analysis reveals that current civil aviation laws, primarily designed for commercial aviation, lack provisions to monitor, deter, or respond effectively to hostile overflights and missile intrusions. By evaluating principles such as territorial sovereignty, non-intervention, and the duty of due regard, the research identifies critical gaps in Sri Lanka's legal readiness for aerial threats. The paper proposes legal and policy reforms to strengthen Sri Lanka's legal readiness, including integrated radar surveillance, early warning systems, and a defence-oriented framework for airspace governance. By placing Sri Lanka at the centre of the analysis, the study highlights the vulnerabilities of small but strategically important states when confronted with transboundary missile threats. It argues that improving legal readiness is essential to adapt national frameworks to the realities of modern aerial security. In this way, the research contributes to the broader discourse on the role of public international air law in managing emerging geopolitical and technological challenges within national airspace.

Keywords: *Airspace sovereignty, Legal readiness, Public International Air Law, Sri Lanka, Transboundary missiles*

Regulating campaign finance and ensuring electoral fairness: An analysis of the Regulation of Election Expenditure Act No. 3 of 2023 of Sri Lanka

S. Susarithaa

Department of Public and International Law, Faculty of Law, University of Colombo, Sri Lanka

The elections in Sri Lanka have long been shaped by the influence of financial capital and campaign finance, particularly following the introduction of the Proportional Representation electoral system during the 1970s. The unregulated election campaign finance has impacted and undermined the electoral fairness and integrity of electoral competition in Sri Lanka. It allows wealth and money to play a dominant role in political competition. This paper examines the core research problem as the extent to which the Regulation of Election Expenditure Act No. 3 of 2023 can rectify financial disparities and inequality in election campaigns and enhance electoral fairness in Sri Lanka as an important statutory framework for regulating election campaign finance and expenditure. This paper examines the potential of this act to reduce the effects of financial disparities among candidates during the election campaign and provide an equitable opportunity to be elected to office. This study adopts a qualitative legal research methodology, relying on doctrinal analysis of the statute, relevant constitutional provisions, and secondary sources, including books, journal articles, and working papers. This study critically analyzes the potential of this legislative enactment in creating fair competition in elections. It also examines the problems associated with the enactment, specifically the effectiveness of the law, which is hindered by ambiguous provisions, limited enforcement power vested in the Election Commission, and a lack of oversight mechanisms. This enactment marks a progressive step, but risks becoming a mere black-letter safeguard without support from structural and institutional mechanisms to ensure robust and impartial enforcement. Drawing on constitutional principles enshrined in Articles 3, 4, and 12 of the 1978 Constitution of Sri Lanka, this paper examines how far this enactment upholds the principles of representative democracy. This study recommends a more robust and participatory framework to ensure not only compliance but also accountability, where the electorate holds its power accountably, thereby opening an avenue for voices of all segments of society. A limitation of this study lies in the restricted scope of analysis, which is confined to the analysis of the provisions of the Act, without extending to its practical implementation and impact.

Keywords: *Electoral fairness, Campaign finance, Election expenditure, Representative democracy, Accountability*

‘The *Parthenon* Equilibrium’: The tripartite architectural structure of the International Humanitarian Law

K. Amarasinghe

Department of Public and International Law, Faculty of Law, University of Colombo, Sri Lanka

A novel architectural theory of International Humanitarian Law (IHL) can be proposed by using the *Parthenon*, an icon of ancient Greek architectural construction, as a metaphor to explain consistency and balance of the IHL. Accordingly, it can be argued that IHL functions as a tripartite structure grounded in the foundational equilibrium of military necessity and humanity, operationalised through three interdependent supports: (1) limitation of means and methods of warfare, (2) protection of protected persons & properties, and (3) reduction of unnecessary suffering and destruction. Based on this foundation, there are three fundamental load-bearing pillars: (i) Principle of Distinction, (ii) Principle of Proportionality, and (iii) Principle of Precaution, which can be translated into practice. *Inter alia*, these pillars uphold the roof of humanity, demonstrated in three protective dimensions: (a) protection of civilians, (b) protection of *hors de combat*, and (c) protection of specific protected persons. By drawing IHL’s normative architecture into the *Parthenon*’s physical structure, this study seeks to explore how IHL’s stability relies on the balance between its humanitarian considerations and military necessities. The ‘*Parthenon* Equilibrium’ thus offers a unified model for understanding the basic structure of International Humanitarian Law. Hence, this architectural metaphor provides a unified theoretical framework for understanding how the foundation, pillars, and roof of IHL must exist in dynamic equilibrium to effectively constrain the conduct of warfare while acknowledging legitimate military necessities anticipated. Accordingly, this study will employ a qualitative research methodology, grounded in a descriptive analytical approach, with the objective of conceptualising and critically examining the tripartite architectural structure of International Humanitarian Law. This methodological framework enables a comprehensive exploration of the underlying principles, interdependent support, and normative foundations that sustain the equilibrium between military necessity and humanitarian considerations.

Keywords: *International Humanitarian Law, Parthenon equilibrium, Humanity, Military necessity*

Significance of international law in legal research: A Third World approach to the transferability of international legal standards to domestic contexts

W. Seneviratne, K. A. A. N. Thilakarathna

Department of Public and International Law, Faculty of Law, University of Colombo, Sri Lanka

This paper critically interrogates the fraught and often asymmetrical relationship between international law and domestic legal research through the analytical lens of Third World Approaches to International Law (TWAIL). It explores how international legal standards and norms are transferred, selectively adapted, or outright contested within the legal systems of postcolonial states, where the legacies of imperialism continue to shape institutional, epistemic, and normative landscapes. By grounding the inquiry in TWAIL's four central critiques, historical, structural, epistemic, and emancipatory, which collectively expose the deep-rooted inequalities and hegemonic biases embedded in the international legal order this study challenges the presumed universality, neutrality, and legitimacy of international legal norms. Through a methodology that combines critical discourse analysis, multi-sited ethnography, and decolonial research strategies, the paper analyzes case studies from Sri Lanka and India to reveal how embedding of international legal standards often fails to resonate with local legal imaginaries and social realities. The findings emphasize that such legal transfers are not merely technical acts of compliance or reform, but politically loaded processes that risk reproducing colonial hierarchies under the guise of universality and modernization. The research argues that meaningful integration of international norms into domestic systems demands hybridization strategies that privilege local jurisdiction, incorporate indigenous legal epistemologies, and embrace community-based participatory mechanisms. Rather than viewing resistance to international law as regressive or parochial, the paper positions it as a necessary and generative act of legal self-determination as a sovereign right that meets up a State's international obligations. It concludes that TWAIL provides a robust conceptual and methodological framework to move beyond tokenistic inclusivity or reformist caricature, toward a pluralistic and emancipatory vision of international legal ordering one that genuinely respects local sovereignty, values epistemic diversity, and addresses the democratic deficits inherent in the global legal regime that respect decolonized identity of former colonies. In doing so, this work contributes to broader debates on the decolonization of legal knowledge, the politics of normativity, and the construction of a more equitable and multipolar international legal order.

Keywords: *Third World Approaches to International Law, Legal hybridization, Postcolonial legal systems, International norm transfer*

From formality to substantive justification: Evolving standards on judicial accountability and reasoned decision making in Sri Lanka

U. A. T. Udayanganie

Department of Public and International Law, Faculty of Law, University of Colombo, Sri Lanka

This study focuses the significant role of judicial accountability in Sri Lanka, emphasizing that judges, as guardians of justice, must deliver decisions grounded in reason, fairness, and integrity to ensure public trust and uphold the rule of law. Disregarding these standards undermines judicial legitimacy. While Sri Lankan law does not explicitly recognize judicial accountability, it is indirectly reinforced through some statutory provisions and setting standards for judgment writing, conducts, and reviews. The Civil Procedure Code (S.186) and Criminal Procedure Code (S.283) require judges to state issues, decisions, and reasons in judgments. The Judicature Act and Evidence Ordinance also influence decision-making quality and integrity. However, Sri Lanka lacks a clear and consistent approach to reasoned decision-making as a core element of accountability. Its importance has been highlighted in recent cases such as *Pathirathne v. Mahinda Yapa Abeywardena and Others* (SC/FR/35/2024), *Sanjeewa Fernando and Others v. Somawathie Perera* (SC Appeal/1/2025), and the *MV X-Press Pearl* matter. These cases reflect a shift from considering reasons as a procedural formality to recognizing them as a substantive tool for accountability. Recent Supreme Court rulings, especially in matters of judicial appointments, deprivation of liberty, and public interest litigation, show a trend toward robust, context-sensitive reasoning. This research will analyze recent case law to trace this evolution and assess its implications for accountability. It will evaluate whether current standards balance judicial independence with public trust and propose reforms to strengthen that balance. Grounded in the concept of deliberative legitimacy, judicial power draws its legitimacy not only from constitutional or statutory authority but also from well-reasoned legal justifications that uphold the rule of law, protect individual rights, and serve the public interest. In essence, it is the quality of reasoning not merely the source of authority that sustains judicial legitimacy. The doctrinal method will be used to examine statutes, constitutional provisions, case law, and judicial interpretations relating to the duty to give reasons and judicial accountability.

Keywords: *Judicial accountability, Judicial reasoning, Deliberative legitimacy, Public trust, Judicial independence*

A legal analysis on the treatment of cultural property: Special reference to the 1638 Westerwolt Treaty in light of the contemporary Dutch restitution process

D. Madhushan¹, N. Kamardeen², W. Veraart³, N. Dewasiri⁴

¹*Department of Private and Comparative Law, Faculty of Law, University of Colombo, Sri Lanka*

²*Department of Commercial Law, Faculty of Law, University of Colombo, Sri Lanka*

³*Department of Legal Theory and Legal History, Vrije University, Netherlands*

⁴*Department of History, Faculty of Arts, University of Colombo, Sri Lanka*

The 1638 Westerwolt Treaty between the Dutch VOC and the King of Kandy was premised on the understanding that the Dutch would expel the Portuguese from Ceylon in exchange for significant trading advantages in Ceylon. Though this treaty was considered binding and legal, some historians are of the view that certain disparities in translation and interpretation reveal an intention to misrepresent certain provisions to favour the Dutch. Therefore, this treaty can be considered an *unequal treaty* that resulted in favouring the Dutch while significantly reducing the sovereignty of the Kingdom of Kandy. The treaty contained provisions on the taking and division of war booty. While both parties were equally motivated in this regard, historical records and certain events that took place seem to indicate that the Dutch were more active in this endeavour. The research aims to identify and analyse the principles, concepts, and practices in the 1638 treaty regarding the treatment of cultural property. This research employs both doctrinal and socio-legal methods of inquiry. Furthermore, desk-based investigations are the primary data collection method, while empirical methods such as expert interviews are used to shed more light on this novel area of research. Findings reveal that even though none of the provisions in the 1638 treaty explicitly dealt with the term ‘*cultural property*’, the broader term ‘*war booty*’ referred to in the treaty could be said to include cultural property. This is useful for countries of origin of cultural property in formulating substantial legal arguments to claim ‘*justice*’ in the restitution process of the Dutch Government (as manifested in its Restitution Policy), which is currently lagging behind in legal considerations.

Keywords: *Colonial cultural property, Legality, Restitution, Unequal treaty, 1638 Westerwolt Treaty*

Recognising economic and moral rights of performers (singers) in Sri Lanka: Lesson from the European Union and India

D. M. R. A. Dissanayake

Department of Public and International Law, Faculty of Law, University of Colombo, Sri Lanka

As aptly stated by Charlie McCreevy “performing artists are no longer the ‘poor cousins’ of the music business.” A singer or performing artist is a cultural icon who combines artistry, skills and emotional expression. The music industry has always been an integral part of the cultural life in any country and at the heart of this form of art is the singer. As it is evident from recent cases, even though the songs become immensely popular the singer who sings the song is not adequately recognised nor is he or she rewarded adequately for the song. Most strikingly, singers in Sri Lanka have a longstanding grievance that the royalty do not see them throughout their lives and most of singers end up getting nothing. Against this backdrop, the purpose of this research is to examine the current status of performers rights in Sri Lanka and explore the possibility of strengthening the legal regime pertaining to the rights of the performers. The intellectual property (IP) Act, No. 36 of 2003 recognises singers as performers but falls short of guaranteeing moral rights. This research finds that moral rights of the singers in Sri Lanka have not been protected, except for a few economic rights. Moral rights, such as the right to attribution or credit as the performer of the song and the right to object any derogatory uses of the song or claim damages in respect of any distortion or mutilation or other modifications of the song prejudicial to his or her reputation, are vital tools in the hands of performers. In recent years, many performing artists have raised concerns over barring or preventing them from singing their songs and in certain instances lawsuits have been filed against them. Therefore, it is necessary to address this tension drawing inspirations from the European and Indian experiences. In this regard, Sri Lanka should consider acceding to the WIPO Performances and Phonograms Treaty (WPPT) of 1996. In terms of legal and policy implications, this research enlightens policymakers on the compelling need for modernising IP system to afford enhanced protection for singers in Sri Lanka. The research dwells within the black letter legal research coupled with comparative legal analysis.

Keywords: *Performer/Singer, Moral rights, Neighbouring/Related rights, Creative industry*

Profiting from the digitalisation of colonial cultural objects: A comparison of British and Dutch museum practice

N. Kamardeen¹, T. Nanayakkara²

¹*Department of Commercial Law, Faculty of Law, University of Colombo, Sri Lanka*

²*Department of Private and Comparative Law, Faculty of Law, University of Colombo, Sri Lanka*

Colonial cultural objects can be described as cultural objects removed from a country during the era of European colonial expansion, often without the permission of the source country, and almost always without the payment of compensation. Museums of the former colonisers have long benefited financially from the physical objects themselves, through the collection of fees as entrance tickets from visitors. In addition, digital images, either as photographs or as 3-D images, that have been generated by these institutions from such objects, also raise revenue and have the potential to continue generating income for the institution even after the object has been returned to the source country. This problem for source countries that are requesting the return of colonial cultural objects is viewed from a case study concerning the statue of Tara, originally from Sri Lanka, and now at the British museum. The publishers of a research article on Tara, authored by a Sri Lankan researcher, had to pay a sum of 45 euro to the British museum in order to be able to publish an image of the statue of Tara in the publication. The payment was claimed on the basis of ownership of the copyright in the photograph. The research examines the basis of ownership and copyright, and the legality and ethics of claiming rights in digital copies of objects whose ownership is contested. The methodology is comparative where the laws and practices of the British museum will be contrasted with those of Dutch museums that similarly house colonial cultural objects yet take a more liberal approach towards copyright pertaining to digitalized versions of colonial cultural objects. Major findings reveal that institutional practice varies from country to country, and museum to museum. It is recommended that best practices, including consultation with source nations that are requesting the return of such objects, be followed in order to mitigate the negative impacts of the colonial past.

Keywords: *Colonial cultural objects, British museum, Dutch museums, Digitalisation, Copyright, Ownership*

Reforming the legal framework pertaining to the electricity sector in Sri Lanka: A critical appraisal

K. H. Geeganage

Department of Commercial Law, Faculty of Law, University of Colombo, Sri Lanka

The enactment of the Sri Lanka Electricity Act, No. 36 of 2024, heralds a pivotal transformation in the country's power sector, signalling a shift from a vertically integrated monopoly to a functionally unbundled framework premised on transparency, grid neutrality, and market-based planning. Among the reforms introduced, the unbundling of generation, transmission, and distribution functions has taken a front seat, reflecting a global consensus that unbundling represents an international best practice in electricity sector reform. Nonetheless, the newly proposed reforms have elicited considerable criticism, particularly from development partners and stakeholders of Sri Lanka's electricity sector. Key concerns have centered on specific provisions of the Act, including the retention of permanent state ownership, the government's role in tariff-setting, and the perceived risk of reverse integration. These critiques reflect broader debates about market liberalisation, regulatory autonomy, and institutional design in the electricity sector. This research aims to contribute to this ongoing discourse by critically examining the contested provisions of the Act and exploring their legal, institutional, and policy implications. Adopting a doctrinal method supported by comparative legal analysis, the research engages with international reform experiences, most notably those of Germany and India to assess the coherence, viability, and transitional dimensions of Sri Lanka's evolving electricity reform framework. Key findings demonstrate that the unbundling measures outlined in the Act are aligned with the Independent System Operator (ISO) model, a globally established and widely adopted structure in electricity sector liberalisation. Additionally, the Act's procurement and regulatory provisions appear to establish a legal and institutional framework that may facilitate future liberalisation efforts. Instead of conclusively supporting or impeding market reform, the legislation introduces structural elements that warrant further examination in terms of their potential to contribute to a transparent, competitive, and adaptive electricity market. The research suggests that the effectiveness of the legislative framework is likely to depend on the manner of its implementation, the strength of supporting institutions, and the extent to which market readiness is developed over time.

Keywords: *Sri Lanka Electricity Act, Unbundling, Independent System Operator, Vertically integrated monopoly, Grid neutrality*

Impact of stringent interpretation of tax provisions on funded research in universities: A case study from Sri Lanka

P. K. M. Nanayakkara, N. Kamardeen, D. Pathirana

Department of Commercial Law, Faculty of Law, University of Colombo, Sri Lanka

One of the basic principles of income tax is that only income, and not savings, should be taxed. The progressive violation of this principle has resulted in many non-income receipts being taxed under the Sri Lankan tax system. Previously, income earned by providing services to foreign clients, whether the services were performed within or outside Sri Lanka, was entirely exempt from income tax, provided the earnings were brought into the country. However, from April 1, 2025, such income was subject to a maximum tax rate of 15%, provided it was received in foreign currency and remitted to Sri Lanka through a licensed bank. If the income is not remitted via the formal banking system, it will be taxed according to the standard progressive income tax rates, which may reach up to 36%, depending on the individual's total taxable income. The particular case study at hand concerns the reimbursement of the cost of an air ticket purchased by a foreign collaborator of a research project led by a Sri Lankan public university. The Inland Revenue Department of Sri Lanka withheld 14% of the total cost of the ticket as income tax. This deduction led to the recipient, who is not a taxpayer resident in Sri Lanka, receiving only 85% of the reimbursable amount. The research examines the provisions of the Inland Revenue Act No. 24 of 2017 (as amended), particularly the negative list, to determine the reasons for taxing such reimbursements. It also analyses the broader principles of taxation to suggest proposals for reform and rethinking of taxation, to promote the research culture in universities, which could be stifled due to such measures. The methodology used is doctrinal, and desk-based research methods, along with specific factors related to the case study, were employed. Findings suggest that the stringent interpretation of tax provisions causes unwillingness for foreign collaborators to partner in research projects, resulting in a loss in funding as well as research experience for Sri Lankan universities.

Keywords: *Tax deductions, Non-resident citizens, Foreign source income, Non-income receipts, Negative list*

Strengthening personal data protection law regime in Sri Lanka: A critical perspective

N. S. Punchihewa

Department of Commercial Law, Faculty of Law, University of Colombo, Sri Lanka

Data is the new oil of the 21st century.’ As the foregoing metaphor illustrates data fuels the digital economy of today. The topic of personal data protection has come to the forefront of academic discourse in Sri Lanka in recent years. With the introduction of the long-awaited Personal Data Protection Act, No. 9 of 2022, Sri Lanka heralds a new era for personal data protection creating a conducive environment for businesses to operate. Viewed through the lens of its objectives, the Act is designed to protect the personal data rights of Sri Lankan citizens while fostering growth in the digital economy. However, it is a matter of concern that the Act has faced criticism over its implementation as well as loopholes in its substantive provisions. Therefore, the purpose of this research is to critique the new data protection legislation along with its implementation challenges in view of current realities in Sri Lanka. In terms of the methodological approach of this research, it dwells within the positivist black-letter legal research methodology coupled with comparative legal analysis. The results of this research indicate that the enactment of this landmark legislation is a welcome step in aligning Sri Lanka with global data protection standards. Nevertheless, there remain many questions than answers with regard to operational clarity and preparedness of Sri Lankan businesses and public sector institutions to adopt this new regulatory environment. Perhaps even more importantly, the new regime has encountered a number of criticisms, including but not limited to, inadequate protection of personal data gathered through AI systems, imperfections as to the definition of ‘sensitive personal information’ and legal uncertainties over cross border data transfers. Analysing the lessons learned from the EU, Sri Lanka should closely follow the development under the GDPR 2016, and the EU AI Act 2024. Arguably, there is a pressing need to further strengthen the Sri Lankan legal regime before it is being fully implemented. In terms of implications of this research, this will enlighten policymakers to rethink about this new regime in a more critical manner and to address perceived deficiencies in order to make the Act a strategic enabler of Sri Lanka’s digital transformation.

Keywords: *Personal data protection, Legal challenges, EU experience*

Exclusion clauses in insurance contracts in Sri Lanka: The need for law reform

W. M. N. A. Dinendra

Department of Commercial Law, Faculty of Law, University of Colombo, Sri Lanka

From a legal standpoint, an exclusion clause in an ordinary contract is designed to limit or eliminate liability arising from such a contract. In contrast, an exclusion clause in an insurance contract is not generally designed to exclude, restrict or limit a party's legal liability. They are carefully crafted to demarcate the boundaries of the risk being insured by stipulating what shall 'not' be covered under such a contract of insurance. Therefore, the purpose of this research is to critique the role and impact of exclusion clauses in an insurance contract in Sri Lanka and formulate law reforms to enhance consumer protection and legal certainty. Employing a doctrinal research methodology supplemented by a comparative legal analysis, the research scrutinizes domestic legislation, judicial decisions, and secondary legal sources both in Sri Lanka and other jurisdictions. Findings of this research reveal that the Sri Lankan law permits the use of exclusion clauses and there is a regulatory mechanism in place providing safeguards such as the 'duty of disclosure' and the 'contra proferentem rule.' However, such a mechanism is inconsistently applied leading to unpredictability and imbalance in insurer-policyholder relations. It is evident that exclusions are construed strictly; therefore, it is the duty of the insurers to except their liability in clear and unambiguous terms. Moreover, the 'contra proferentem' rule applies against the drafter of a document which stipulates that any ambiguity in the wording of the document is to be interpreted against the party who drafted it. The study also identifies a critical need for legislative intervention to introduce statutory guidelines for the drafting, interpretation, and enforceability of exclusion clauses, thereby reducing ambiguity and ensuring fairness and researcher aims to concern on current industrial practices of the insurance trade. Limitations of the research include the restricted access to empirical data from the insurance industry and the reliance on case law that may not reflect recent market practices. Nevertheless, the study offers original value by articulating a reform-oriented legal framework that balances contractual freedom with consumer rights. It contributes to the broader discourse on insurance contract law in developing jurisdictions and provides a strategic roadmap for policymakers, legal practitioners, and academics aiming to foster a more equitable insurance regime in Sri Lanka.

Keywords: *Exclusion clauses, Insurance contract, Legal certainty*

Beyond borders and barriers: Holding Multinational Corporations criminally liable for human rights violations in host nations

W. I. Nanayakkara

Department of Commercial Law, Faculty of Law, University of Colombo, Sri Lanka

Due to the worldwide scale of their operations, Multinational Corporations (MNCs) often conduct business in nations with inadequate human rights protections and government control, which is a consequence of the ever-increasing global trade and investment. Laws should clearly define the liability of companies that engage in human rights violations overseas. A "failure to prevent" framework should compel companies to disclose their due diligence efforts and establish specialized prosecution units with international jurisdiction. This research explores whether MNCs conducting business in host countries that violate human rights should be subject to corporate criminal liability. Assigning corporate responsibility for such breaches is increasingly reflected in evolving legal frameworks and international instruments. The objective of this research is to examine both international and domestic legal mechanisms, existing and emerging, that attribute criminal responsibility to corporate entities. Drawing on principles of corporate criminal liability as developed in the U.S., UK and Australian law, this study explores how these models can be adapted to address extraterritorial human rights violations by MNCs. By analyzing case studies, relevant legal frameworks and recent global reforms, the research highlights emerging trends in corporate accountability. A desk-based doctrinal methodology is employed, with comparative legal analysis of statutes, judicial precedents and scholarly interpretations across jurisdictions. It further draws on selected case studies and international legal sources to assess how corporate criminal liability is evolving in response to cross-border human rights violations. The research concludes that without comprehensive criminal accountability mechanisms, MNCs may continue to harm people avoiding legal consequences. A reimagined liability framework, grounded in universal standards and enforceable at the national levels is essential to ensure justice for victims and to reinforce corporate criminal accountability for human rights violations committed across borders.

Keywords: *Corporate criminal liability, Host states, Extraterritorial jurisdiction, Business and human rights*

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University of Colombo
Sri Lanka*



It is with great pleasure that I extend my warm greetings to all participants of the 5th International Research Symposium of the Faculty of Education, University of Colombo (EDIRS) 2025, to be held on 18th November 2025, on the theme “Educational Research for Resilience: Embracing Change and Navigating Challenges.” As the theme of this conference highlights, research drives innovation. Without research, the innovations, changes, and challenges might never have come to fruition in society. It encourages the development of new technologies, reflecting global trends, and adapts to the educational research culture, generating actionable insight for policy formulation and educational leadership, ensuring that they are based on evidence and not just tradition or opinion. This landmark event reflects the Faculty of Education’s ongoing dedication to advancing educational research and fostering meaningful dialogue among academics and practitioners from Sri Lanka and beyond.

I am deeply grateful to the Chief Guest, Professor Indika Mahesh Karunathilake, Vice-Chancellor of the University of Colombo, whose steadfast leadership and vision continue to inspire and guide our collective academic endeavours. I would also like to acknowledge the two distinguished keynote speakers of EDIRS 2025. Professor Tapio Juhani Lahtero, Administrative Principal at the Faculty of Educational Sciences Training Schools, Viikki Teacher Training School, University of Helsinki (Yläkoulu ja Lukio), Finland, brings invaluable international perspectives on teacher education and educational leadership. Dr. Darshana Samaraweera, Deputy Director General of the National Institute of Education, Sri Lanka, plays a pivotal role in curriculum development, educational research, policy, and innovation. Their combined expertise and leadership are expected to enrich the symposium discourse and inspire participants, fostering deeper insights and meaningful professional exchange.

I wish to place on record my sincere appreciation to the Symposium Organizing Committee, whose tireless dedication and exemplary efforts have been instrumental in the successful organization of this event. I also extend my heartfelt gratitude to the staff of the Faculty of Education for their continued support, and the presenters' contributions formed the foundation of this scholarly gathering. I firmly believe that the interactions and collaborations fostered through EDIRS 2025 have significantly strengthened our collective vision of transforming education to meet the demands of a rapidly changing world. Finally, I would like to extend a warm welcome to all participants of this symposium and wish for its proceedings to be immensely successful.

MESSAGE FROM THE SYMPOSIUM CHAIR & CO-CHAIR



Dr. S. Athirathan (Chair)

*Department of Social Science Education
Faculty of Education
University of Colombo, Sri Lanka*



Dr. N. M. M. Safeek (Co-Chair)

*Department of Educational Psychology
Faculty of Education
University of Colombo, Sri Lanka*

When the Faculty of Education celebrates its 50 years of service to the field of education in Sri Lanka and abroad, it is my great pleasure to write this message as the chair of the 5th International Research Conference 2025. The theme for this year is 'Educational Research for Resilience: Embracing Change and Navigating Challenges'. This prestigious event aims to bring together educators, researchers, policymakers, and students to explore the vital role of resilience in education amidst a rapidly changing world. In recent years, the educational landscape has undergone significant transformation due to technological advancements, global pandemics, socio-economic shifts, and evolving pedagogical practices. These changes, while presenting numerous opportunities, also pose considerable challenges that require adaptive strategies and resilient approaches. The theme "Educational Research for Resilience: Embracing Change and Navigating Challenges" underscores the importance of proactive research and innovative solutions to foster resilience within educational systems. The conference is scheduled to take place on 18th November 2025 via hybrid mode. The Chief Guest at this year's Research Symposium is the Vice-Chancellor of the University of Colombo, Professor Indika Mahesh Karunathilake and two internationally renowned figures in the field of education will deliver the keynote speeches. Professor Tapio Juhani Lahtero, Professor and Administrative Principal at Helsinki Normal Lyceum, University of Helsinki, Finland, possesses expertise in the field of education and leadership, while Dr. S. D. D. Samaraweera, Deputy Director General of the National Institute of Education, Sri Lanka, is a distinguished academic specializing in educational development and research.

A hundred Extended Abstracts were selected through double blind reviews. The conference will feature a diverse range of presentations, including empirical research studies, theoretical frameworks, case studies, and practical interventions. Topics will cover areas such as

curriculum adaptation in times of crisis, mental health and well-being of students and teachers, digital literacy and technology integration, inclusive education, and community engagement. The Symposium provides an opportunity for the participants to develop a deeper understanding of how to build resilient educational environments capable of withstanding future uncertainties. The University of Colombo's Faculty of Education is committed to advancing educational research that contributes to positive societal impact. This conference seeks to foster a community of scholars and practitioners dedicated to strengthening resilience in education. Attendees will have the opportunity to network, share ideas, and collaboratively develop actionable solutions to current and future challenges.

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SYMPOSIUM PROGRAMME

8.00 am – 9.00 am	Refreshments
9.00 am – 9.30 am	Registration
9.30 am – 9.40 am	Inauguration of the Session
9.40 am – 9.45 am	Pooja Dance
9.45 am – 10.00 am	Welcome Address <i>Prof. Samudra Senarath</i> <i>Dean, Faculty of Education</i>
10.00 am – 10.15 am	Address by the Chief Guest <i>Prof. Indika Mahesh Karunathilake</i> <i>Vice-Chancellor, University of Colombo</i>
10.15 am – 10.40 am	Keynote Address - I “Strategic leadership in support of organizational culture change” <i>Prof. Tapio Juhani Lahtero</i>
10.40 am – 11.05 am	Keynote Address - II <i>Dr. S. D. D. Samaraweera</i> <i>Deputy Director General</i> <i>National Institute of Education, Sri Lanka</i>
11.05 am – 11.15 am	Vote of Thanks Dr. S. Athirathan, Chair / EDIRS 2025
11.15 am – 12.00 pm	Poster Presentation
12.00 pm – 1.00 pm	Lunch
1.00 pm – 3.00 pm	Technical Sessions Panel 1: Humanities & Language Education Panel 2: Social Science Education Panel 3: Educational Psychology Panel 4: STEM Education Panel 5: Educational Management & Administration Panel 6: Multi-Disciplinary
3.00 pm – 3.30 pm	Award of Certificates & Conclusion
3.30 pm – 4.00 pm	Refreshments End of the conference of EDIRS 2025

INTRODUCTION TO THE KEYNOTE SPEAKER – I

Dr. Tapio Juhani Lahtero

Adjunct Professor

Administrative Principal

Helsinki Normal Lyceum, University of Helsinki

Viikki Teacher Training School, University of Helsinki

Finland



Dr. Tapio Lahtero holds a Ph.D. and is an Adjunct Professor. Dr. Lahtero has held various positions in his career both in the education departments of municipalities and universities. At present, he is the Administrative Principal of the University of Helsinki Teacher Training Schools; the Viikki Teacher Training School and the Helsinki Normal Lyceum. Dr. Lahtero graduated as a primary teacher at the University of Turku in 1993. He received his doctorate from University of Jyväskylä in 2011 and his doctoral thesis was on “Leadership culture at schools”. In 2015, he completed his MBA in Leadership in Public Management at the University of Tampere. Dr. Tapio Lahtero has worked for over ten years as a principal, as a regional principal and as the head of the comprehensive schools in the education department in City Vantaa. Since 2015, he is the Administrative Principal of both Teacher Training Schools; University of Helsinki – Viikki Teacher Training School and Helsinki Normal Lyceum. Dr. Tapio Lahtero is the leader of the principal training programme at the University of Helsinki. He has been educating principals and leaders of education departments of municipalities at the Universities of Jyväskylä, Turku and Helsinki. His areas of expertise include strategic leadership, distributed leadership, and broad-based pedagogical leadership and he has published several research articles. He has co-authored books, including Educational Leadership in Finland – Principal’s role in building a sustainable school culture, which explores the foundational role of principals in Finland education system. As a leading academic on Finnish education, Dr. Lahtero has provided guidance on school leadership during the COVID-19 pandemic and discussed the cultural reasons behind Finland’s commitment to keeping schools operational.

ABSTRACT OF THE KEYNOTE ADDRESS – I

Strategic Leadership in Support of Organizational Culture Change

Dr. Tapio Juhani Lahtero

Adjunct Professor

University of Helsinki, Finland

The presentation examines the implementation of strategic leadership in the work of comprehensive school leadership teams and the challenges of managing change in operating culture. The presentation is based on a combined analysis that utilizes both the experiences of members of comprehensive school leadership teams in a Finnish city in the three areas of strategic leadership – planning, implementation and evaluation – and a model describing the change in operating culture (Lahtero & Kuusilehto-Awale, 2013; Lahtero, Loukomies & Laine, 2025). The aim of the presentation is to show how strategic leadership can contribute to supporting the change in operating culture, which often encounters resistance to change, uncertainty and slow progress. Even if a new operating model does not initially produce the desired results, strategic leadership – in particular joint planning, committed implementation and systematic evaluation – can help overcome the challenges of the initial phase of the change process and prevent a return to old, ineffective practices. The presentation emphasizes that changing the operating culture is not only the responsibility of the individual school principal but requires strategic commitment and pedagogical leadership from the entire educational management. Strategic leadership structures and practices can provide concrete tools for supporting change, involving staff, and instilling a shared vision in the school community.

INTRODUCTION TO THE KEYNOTE SPEAKER – II

Dr. Darshana Samaraweera

*Deputy Director General
National Institute of Education
Sri Lanka*



Dr. Darshana Samaraweera is a distinguished education leader and researcher currently serving as the Deputy Director General of the Faculty of Languages, Humanities and Social Sciences at the National Institute of Education (NIE), Sri Lanka, a position he has held since 2021. With a Ph.D. from Management and Science University, Malaysia, specializing in the critical areas of teacher burnout, mentoring, and self-efficacy among pre-service ESL teachers, Dr. Samaraweera brings deep research insight to national policy implementation.

Having joined the NIE in 2004, he has dedicated over two decades to curriculum development and teacher training, including serving as the Director of the Department of English. His work has been central to major national initiatives, including the development of the National Curriculum Framework and the integration of listening and speaking skills into the formative assessment system. Currently he serves as a key contributor to the proposed general education transformation to be introduced to the education system in the year 2026.

Dr. Samaraweera is a highly sought-after keynote speaker and resource person, frequently addressing topics at the intersection of digital transformation, language education, and Generative AI in learning environments, as seen in his recent addresses in India and Sri Lanka. He is also the former Chair of the Sri Lanka English Language Teachers' Association (SLELTA) and has contributed significantly to educational policy as a member of the National Oversight Committee on Implementing the National Education Policy Framework. His expertise ensures that his insights into educational reform are both strategically sound and globally informed.

ABSTRACT OF THE KEYNOTE ADDRESS – II

Educational Research for Resilience: Embracing Change and Navigating Challenges

Dr. Darshana Samaraweera

Deputy Director General

National Institute of Education, Sri Lanka

Human history has arrived at a point where change takes place at an unimaginable speed. This is common to all aspects of life, and as a result the life has become more challenging and unpredictable than we perceive. The world we thought had existed only in movies and science fiction is becoming real day by day. The concept of human machine collaboration we experience today, with the introduction of Generative AI is one such example. With the transition from the 4th Industrial Revolution to the 5th Industrial Revolution within a very short time period like 10 years we have been able to experience all these changes. The most interesting factor about these changes is that the humans achieved all these within such a short period overcoming the challenges posed by a global pandemic that threatened the human existence. This is a great example of resilience of mankind in the face of adverse circumstances. In this context, it is clearly understood that resilient people, resilient industries and resilient organizations can overcome the challenges of the unpredictable future. Educational research is no exception in this regard. Both resilient educational research and educational research to foster resilience are equally important here.

LIST OF THE ABSTRACTS

An evaluation of the alignment between the senior secondary geography curriculum of Sri Lanka and Sustainable Development Goal 15: A textbook-based content analysis <i>D. M. C. N. Kumari, L. N. P. Wedikandage</i>	271
A systematic literature review of school self-evaluation frameworks used in various countries <i>W. A. M. G. Wanniarachchi, I. G. C. Chandrakumara</i>	272
Teachers' usage of effective positive psychological strategies in addressing psychosocial issues of secondary school students: A review of literature <i>N. D. Thenuwara, R. A. B. U. I. Perera</i>	273
Fostering proficient digital citizens: Communication and media studies as a gateway in Sri Lanka <i>K. G. M. Perera, P. K. J. E. Nonis</i>	274
Adapting and validating the academic self-efficacy scale for G.C.E. Advanced-Level students in Sri Lanka <i>K. Piratheeban, L. M. K. Bandara</i>	275
Multilevel learning approach to enhance self-efficacy in teaching scientific inquiry: A critical review <i>M. A. D. Chamara, D. V. K. P. Seneviratne</i>	276
A study on the impact of technology devices use on the psycho social problems of school children <i>A. M. T. H. Wijesiri, S. Senarath</i>	277
Challenges faced by humanities undergraduates in developing employability skills in the university system of Sri Lanka: A study based on literature <i>F. N. Wickremasinghe, E. S. Neranjani</i>	278
Global perspectives on School-Based Assessment (SBA): A systematic review of international practices and challenges <i>E. M. Y. Sachith, R. D. C. Niroshinie</i>	279
Existing level of academic stress among the Student Teachers: A study based on Tamil-medium National Colleges of Education in Sri Lanka <i>S. Pirashanthan, S. Athitharan</i>	280
A critical study of adapting techno-pedagogy for rural school classrooms <i>A. Paunanthie, S. Jayabharathi, A. Tholappan</i>	281
Teacher professionalism in Sri Lanka: A comprehensive literature review on practices and challenges <i>R. G. T. S. Kumari, C. P. W. Malepathirana</i>	282

Factors influencing teachers' motivation: Insights from the Anuradhapura education zone	
<i>K. Meera, R. Vijayatheepan</i>	283
Effectiveness of Student-Centered Learning Strategies in the teaching learning process in subjects of Sinhala and literature	
<i>R. A. S. P. Somarathne, S. S. Dahanayake</i>	284
Implementing CASEL's Three-Legged Stool for SEL in classrooms in Sri Lanka: A case study	
<i>F. Srimali, H. M. J. C. Herath</i>	285

An evaluation of the alignment between the senior secondary geography curriculum of Sri Lanka and Sustainable Development Goal 15: A textbook-based content analysis

D. M. C. N. Kumari, L. N. P. Wedikandage

Department of Social Science Education, Faculty of Education, University of Colombo, Sri Lanka

Geography education is crucial for equipping students with the knowledge and skills needed to understand and address sustainability challenges. Geography textbooks serve as essential tools for integrating the Sustainable Development Goals (SDGs), particularly SDG 15, into education. They help students grasp key environmental issues such as biodiversity, land use, and conservation. By providing consistent exposure to sustainability themes, textbooks connect global goals with local challenges. Research indicates that aligning geography education with SDG 15 can positively influence students' attitudes and behaviours towards environmental responsibility. Therefore, enhancing textbook content is vital for promoting environmental sustainability through education. This study evaluates the extent to which Sri Lanka's senior secondary geography curriculum aligns with the principles and targets of Sustainable Development Goal 15 (SDG 15: Life on Land), with a strong focus on promoting environmental sustainability. The main objective is to critically assess how well SDG 15 concepts are integrated within the geography textbooks used in government schools for Grades 10, 11, and in teachers' guides for Grades 12 and 13. A qualitative content analysis method was employed to systematically examine the textbook content, guided by a coding framework based on SDG 15's specific targets, which include themes such as biodiversity conservation, forest protection, sustainable land use, and ecosystem restoration. The analysis evaluated the frequency, depth, and context of these sustainability themes throughout the textbooks. The findings revealed that while some elements related to SDG 15 are present, the overall integration across the curriculum is limited and often superficial. Key areas like biodiversity conservation and sustainable land management were either underrepresented or addressed in a fragmented manner. Additionally, there was a lack of practical, place-based, or experiential learning activities that could help students connect more meaningfully with real-world environmental issues. These findings underscore the necessity for curriculum and textbook revisions to ensure a more comprehensive and coherent integration of SDG 15 principles. The study also highlights the importance of enhancing teacher training to effectively deliver sustainability content. Strengthening geography education in this manner supports both national and global efforts to achieve the goals outlined in SDG 15.

Keywords: *Geography curriculum, Sustainable Development Goal 15, Environmental sustainability, Textbook content analysis*

A systematic literature review of school self-evaluation frameworks used in various countries

W. A. M. G. Wanniarachchi¹, I. G. C. Chandrakumara²

¹*Management and Quality Assurance Branch, Ministry of Education, Sri Lanka*

²*Faculty of Education, University of Colombo, Sri Lanka*

This systematic literature review (SLR) explores frameworks for school self-evaluation (SSE) used in different countries to improve quality assurance in education. Recognizing that a strong quality assurance process improves efficiency and stakeholder satisfaction, the study highlights the need to update evaluation methodologies in line with global trends. The objectives of this study were to identify existing SSE frameworks used in various countries, analytically determine the core domains of focus, and identify key stakeholders involved in the evaluation process. The research began by identifying 25 international SSE framework documents and using the PRISMA 2020 guidelines for a SLR, duplicates were removed in the identification step. Following a screening process that removed non-English documents and non-SSE frameworks, SSE frameworks from 12 countries—Bahrain, Hong Kong, India, Ireland, Malta, Scotland, South Africa, Tanzania, New Zealand, Australia, United State of America (USA), and Mauritius—were selected for analysis. The thematic analysis revealed seven common domains essential to the design of an SSE model: teaching and learning; leadership and management; student outcomes and achievements; school ethos, climate, and culture; infrastructure and resources; stakeholder engagement and partnerships; and quality assurance and improvement processes. Furthermore, seven key stakeholder groups were identified as participating in the SSE process. Although participation varies by country, the most consistently involved stakeholders are school administrators, teachers, students, and parents. Some frameworks also included the participation of school boards, experts, and non-academic staff. I recommend that any new or revised SSE framework should include these seven domains and ensure the active participation of at least four stakeholder groups: school administrators, teachers, students, and parents, to foster a culture of continuous improvement and accountability within schools.

Keywords: *School self-evaluation frameworks, Domains, Stakeholder*

Teachers' usage of effective positive psychological strategies in addressing psychosocial issues of secondary school students: A review of literature

N. D. Thenuwara, R. A. B. U. I. Perera

Faculty of Education, University of Colombo, Sri Lanka

The approach of positive psychological strategies has gained unprecedented recognition among educators, teachers, and scholars. Babara (2007) stated that positive psychological strategies have gained recognition as an effective way to overcome psychological issues in students, especially in fostering their mental health and resilience. In the late 1990s, Martin E. P. Seligman was the first to introduce positive psychology to the world, emphasizing his work from pathology to strengths and human well-being. This is a literature review related to ongoing research, "Teachers' usage of effective positive psychological strategies in addressing psychosocial issues of secondary students". The work employs secondary data analysis using a systematic review based on academic databases, including Google Scholar, Research Gate, PsycINFO, and PubMed. Erikson's Psychological Development Theory (1968) posits that some students aged 12 to 18 years may fail to explore their values, identity, uniqueness, and future goals due to self-identity confusion, among other factors. He highlighted that the above negativities may occur with low self-esteem, identity crisis, emotional instability and social isolation (Erikson, 1968). A study conducted in China by Zhao, et al (2023), using a quantitative approach with 95545 students from grades 7 to 12, shows that even a mild level of bullying has increased the risk of depression, sleep disorders and anxiety. According to Seligman (2011), the ultimate aim of the PERMA model, which he introduced with a focus on self-satisfaction, self-efficacy, positive thinking, fostering hope, optimism, and resilience, are to promote and enhance the psycho-social well-being of the whole society. A study conducted by Moore et al. (2023) titled "Well-being interventions in Australian secondary schools" has shown that well-being interventions conducted in partnership with martial arts, friendship skills, and music have significantly improved resilience, self-efficacy, and self-satisfaction among students. Teachers play a significant role in supporting secondary school students, addressing psycho-social issues and emotional issues.

Keywords: *Positive psychology, Psycho-social issues, Teachers' intervention*

Fostering proficient digital citizens: Communication and media studies as a gateway in Sri Lanka

K. G. M. Perera, P. K. J. E. Nonis

*Department of Science & Technology Education, Faculty of Education,
University of Colombo, Sri Lanka*

Digital technology has become an integral part of modern life, demanding new competencies from citizens. This study explores the potential of integrating digital citizenship skills (DCS) into Sri Lanka's secondary school Communication and Media Studies (CMS) curriculum as new competencies are demanded in digital society. Although digital engagement among students is increasing, formal education lacks a structured approach to Digital Citizenship Education (DCE). Using Ribble and Park's (2022) S3 framework (Safe, Savvy, Social) and qualitative content analysis, the study evaluates the extent to which current CMS curriculum for Grades 10 and 11 addresses DCS. Findings show that while CMS provides some relevant foundations, the coverage is fragmented and insufficient across key domains of digital safety, critical literacy, and responsible online behaviour. The study recommends that the CMS curriculum should be significantly improved to foster digital citizenship by integrating content on DCS through revising curriculum objectives to explicitly integrate DCS, offering teacher training in DCE, implementing assessment tools, and aligning content with global standards. It also highlights the importance of contextual learning and cross-curricular collaboration. These measures aim to position CMS as a pivotal platform for nurturing informed, ethical, and digitally competent students in Sri Lanka.

Keywords: *Digital citizenship (DC), Digital citizenship skills (DCS), Digital citizenship education (DCE), Curriculum integration, Communication and media studies (CMS)*

Adapting and validating the academic self-efficacy scale for G.C.E. Advanced-Level students in Sri Lanka

K. Piratheeban¹, L. M. K. Bandara²

¹*Faculty of Education, University of Colombo, Sri Lanka*

²*Department of Humanities Education, Faculty of Education, University of Colombo, Sri Lanka*

Academic self-efficacy (ASE) plays a vital role in shaping students' motivation, persistence, and academic success. Despite its theoretical importance and frequent use in international settings, there is a lack of a validated scale for measuring ASE among advanced-level students in the Sri Lankan context. This study introduces and validates the Academic Self-Efficacy Scale (SL-ASES-AL), tailored for advanced-level students in Sri Lanka. The scale was adapted from Dullas (2018) and comprises three dimensions: Perceived Control, Competence, and Persistence, with Self-regulated Learning excluded, as it is considered a distinct construct within the broader research framework. The validation process employed a three-phase approach, consisting of a two-round Delphi and a pilot study. In the first round, responses from 14 experts were analyzed, leading to the exclusion of items falling below the 80% consensus threshold and resulting in 16 items advancing to the second round. In the second round, eight experts evaluated these items for relevance and clarity. Using the Item-Level Content Validity Index (I-CVI) and Scale-Level Content Validity Index, all items attained the maximum I-CVI value of 1.00, indicating excellent content validity. Subsequently, a pilot study was conducted with 61 Advanced-Level students to assess reliability and construct validity. An overall Cronbach's alpha of .841 and dimension-specific alpha values above .70 confirmed high internal consistency. Item-total correlation values further supported construct validity, with eleven items demonstrating strong correlations ($\geq .5$), and five items rated as acceptable. One item, with a slightly lower correlation, was retained in a rephrased form based on expert judgment. These findings confirm that the adapted SL-ASES-AL scale is both valid and reliable for assessing ASE within the Sri Lankan context. It offers a contextually relevant tool to enhance educational assessment and student well-being.

Keywords: *Academic self-efficacy, Scale adaptation, Content validity, Construct validity, Delphi method*

Multilevel learning approach to enhance self-efficacy in teaching scientific inquiry: A critical review

M. A. D. Chamara¹, D. V. K. P. Seneviratne²

¹*Faculty of Education, University of Colombo, Sri Lanka*

²*Department of Science and Technology Education, Faculty of Education,
University of Colombo, Sri Lanka*

This critical review explores the potential of multilevel learning approaches to enhance science teachers' self-efficacy in teaching scientific inquiry. Classrooms today, especially those led by educators qualified through Open and Distance Learning (ODL) require instructional strategies that address diverse cognitive abilities and readiness levels among students. Multilevel teaching, involving differentiated instruction, collaborative learning structures, and technology integration, provides a framework to support inclusive and effective inquiry-based science education (IBSE). Drawing upon Bandura's theory of self-efficacy and key empirical studies, this review examines how multilevel learning structures, professional development (PD), and cognitive diagnostic assessment models contribute to teachers' confidence and instructional competence. The review synthesizes findings from seventy key sources, including works by Seneviratne et al. (2019), Hannah and Lester (2009), and Lee et al. (2023), to present a holistic understanding of how multi-tiered learning dynamics improve science inquiry instruction. The review uses a critical literature review methodology, evaluating multilevel learning strategies in terms of their influence on teacher professional growth and pedagogical outcomes. It highlights key mechanisms like mentoring, prompting strategies, digital scaffolds, and nested team learning models. Findings indicate that multi-faceted PD embedded in authentic contexts, supported by sustained mentorship and assessment feedback loops, substantially enhances self-efficacy. The paper concludes by proposing a multilevel intervention framework for science educators, particularly those in ODL environments. The study offers recommendations for future PD design, educational leadership, and policy aimed at equipping teachers with the confidence and capability to foster scientific inquiry in heterogeneous learning settings.

Keywords: *Multilevel learning, Teacher self-efficacy, Inquiry-based science education (IBSE), Open and distance learning (ODL), Professional development*

A study on the impact of technology devices use on the psycho social problems of school children

A. M. T. H. Wijesiri¹, S. Senarath²

¹*Faculty of Education, University of Colombo, Sri Lanka*

²*Department of Educational Psychology, Faculty of Education, University of Colombo, Sri Lanka*

The increasing dependence on modern technological devices due to periodic social changes and the arrival of COVID-19 pandemic has become a contemporary issue in society. It exerts various impacts on the social, behavioural, physical, and psychological health of school students representing different economic and social levels. Due to scarcity of studies conducted on the psychological and social problems arising from the use of technological devices among school students in the local context, this research aims to explore the psychological and social issues faced by school students as a result of their use of technological devices, completing the research gap. It will be expected to study the impacts on behavioural, social, physical and psychological health issues by the use of technological devices. This study will be conducted under a mixed methodology that integrates quantitative and qualitative approaches, following a descriptive sequential design. During the implementation of the study, it will be expected to select a representative sample of 10 schools from Kurunegala and Puttalam districts in North-Western Province, proportionally according to strata through simple random sampling. In this process, a sample of 150 students from grades 8 and 9 will be selected through systematic sampling, and quantitative data will be collected by providing questionnaires to them. Qualitative data will be gathered through focus group discussions with students and their parents, semi-structured interviews with teachers. The quantitative data collected in this manner will be analyzed using descriptive statistics, correlation analysis such as chi-square, and inferential statistical methods like T-test and ANOVA, while qualitative data will be analyzed through thematic and content analysis methods. This study recommends an understanding to researchers and community about psycho-social issues arising from school students' use of technological devices within local context, contributing new knowledge to research field, and implementing a mental counseling programme through human resource contributions.

Keywords: *School students, Technological devices, Psycho social problems, Behavioral issues, Social issues*

Challenges faced by humanities undergraduates in developing employability skills in the university system of Sri Lanka: A study based on literature

F. N. Wickremasinghe, E. S. Neranjani

Faculty of Education, University of Colombo, Sri Lanka

The employability challenges Sri Lankan Humanities Undergraduates (HU) face are multifaceted, primarily arising from a misalignment between educational outcomes and market expectations. In this context, the study investigates current initiatives for developing employability skills (ES) in Sri Lanka, identifies the challenges HU encounters in developing ES within the university system, and offers recommendations for policymakers, educators, and industry stakeholders to address these obstacles. Additionally, it examines relevant theories such as human and social capital, graduate identity and experiential learning theories that relate to the challenges faced by HU in higher education and in cultivating ES to facilitate a seamless transition of graduates into the workforce. The research adopts an interpretivist paradigm, employs a qualitative approach and is grounded in literature analysis. Purposive sampling was used to select existing documents, including university policies, academic literature, and government reports. Thematic analysis yielded three principal themes: first, the curriculum is outdated and not aligned with industry needs; second, career guidance services are under-resourced, with limited student access and insufficient emphasis placed upon them; and third, a lack of practical experience stemming from traditional teaching methods, teacher-directed learning environments, limited engagement with industry, and scarce internship opportunities. These challenges contribute to graduate unemployment and preparedness deficits concerning labour market demands. The findings carry substantial implications for policymakers, educators, and industry stakeholders, emphasizing the necessity of collaborative efforts, informed policy-making, and strategic interventions to enhance the employability prospects of HU in Sri Lanka. Further research is recommended to develop and evaluate interventions aimed at improving the ES of HU.

Keywords: *Challenges, Employability skills, Humanities undergraduates, Sri Lanka*

Global perspectives on School-Based Assessment (SBA): A systematic review of international practices and challenges

E. M. Y. Sachith¹, R. D. C. Niroshinie²

¹*Department of Planning & Evaluation, National Institute of Education, Sri Lanka*

²*Department of Educational Psychology, Faculty of Education, University of Colombo, Sri Lanka*

This systematic review explores the implementation, philosophical foundations, methodologies, and challenges of School-Based Assessment (SBA) across 12 diverse educational contexts, including Finland, Canada, New Zealand, Hong Kong, Singapore, South Africa, the Caribbean, Australia, Malaysia, China, the United States, and Sri Lanka. Drawing from policy documents, empirical research, and academic literature, the study reveals that SBA has emerged as a global educational reform strategy aimed at promoting student-centered learning, formative assessment, and holistic evaluation. The review categorizes SBA systems according to underlying philosophies—such as constructivist and learner-centered models prevalent in Western nations versus the standardized, centralized frameworks dominant in many Asian countries. Despite these variations, SBA is universally acknowledged for its potential to foster deep learning, intrinsic motivation, and meaningful student engagement. However, implementation is hindered by shared challenges including high teacher workload, limited assessment literacy, insufficient training, and the difficulty of achieving consistency in assessment practices. A comparative analysis of 48 key publications from 12 countries using a PRISMA-style approach reveals both commonalities and regional differences in SBA, providing a structured foundation for global policy development. Recommendations underscore the importance of capacity-building, consistent moderation, and integrated policy support to ensure effective, equitable implementation and strong policy support to enable SBA to realize its full potential in enhancing student-centered learning.

Keywords: *School-Based Assessment, Formative assessment, Global educational reform, PRISMA-style approach, Philosophical foundations, Methodologies, Challenges*

Existing level of academic stress among the Student Teachers: A study based on Tamil-medium National Colleges of Education in Sri Lanka

S. Pirashanthan¹, S. Athitharan²

¹*Faculty of Education, University of Colombo, Sri Lanka*

²*Department of Social Science Education, Faculty of Education, University of Colombo, Sri Lanka*

Academic stress is a significant concern affecting student teachers globally, particularly in teacher education institutions where expectations are high, and support systems are often inadequate. This study investigates the current state of academic stress among student teachers in Tamil-medium National Colleges of Education in Sri Lanka. Using a mixed-methods approach, data were collected through structured questionnaires and semi-structured interviews involving final-year student teachers. The study explores various stress-inducing factors such as academic workload, practicum-related pressures, time management challenges, and the struggle to balance personal and academic responsibilities. Findings reveal that a majority of student teachers experience moderate to high levels of academic stress, with females reporting slightly higher stress levels than males. Key stressors identified include assignment deadlines, examination preparation, limited access to Tamil-medium academic resources, and the pressures of performing effectively during teaching practice. Moreover, cultural expectations and the competitive environment within teacher education programmes exacerbate stress. Despite the prevalence of stress, coping strategies adopted by student teachers remain limited, with many relying on peer support, self-motivation, or avoidance techniques rather than institutional or psychological support. The study highlights the urgent need for targeted stress management programmes, culturally relevant counseling services, and curriculum reforms that reduce academic overload while enhancing support for Tamil-speaking student teachers. Addressing academic stress in teacher education not only improves student well-being but also enhances the quality of future educators, which is crucial for the broader educational system in Sri Lanka.

Keywords: *Academic stress, Student teachers, Teacher education, Stress factors, Coping strategies, Teaching practicum*

A critical study of adapting techno-pedagogy for rural school classrooms

A. Paunanthie^{1,2}, S. Jayabharathi², A. Tholappan²

¹*Faculty of Education, University of Colombo, Sri Lanka*

²*Department of Education, Bharathidasan University, India*

The rapid digital transformation of education has disproportionately benefited urban schools, leaving rural institutions in developing nations struggling with systemic challenges in adopting techno-pedagogical approaches. This study critically examines the adaptation of technology-enhanced pedagogy in rural schools in Sri Lanka and India, focusing on infrastructural limitations, teacher readiness, and barriers to student engagement. Despite government initiatives like India's DIKSHA platform and Sri Lanka's Nenasa TV, DAN Tamil, and Nethra programmes, rural classrooms continue to face persistent disparities. Only 27% of rural Indian households have internet access, and only 34% of schools possess functional computers. Teacher preparedness remains a critical bottleneck, with just 28% of Sri Lankan rural educators confident in using digital tools. Through comparative case studies, the research evaluates successful models, including Kerala's localized DIKSHA implementation (with 80% teacher adoption) and Sri Lanka's e-Thaksalawa offline digital libraries, demonstrating that context-specific, low-tech solutions often outperform high-cost, connectivity-dependent systems. The study reveals that passive content delivery models, such as television-based lessons, achieve limited engagement (only 34% student interaction), while interactive, vernacular solutions like India's SMS-based "Tara" chatbot significantly enhance learning outcomes (68% improvement). Hybrid approaches combining radio broadcasts, mobile technology, and community involvement prove most effective, particularly for marginalized groups—girls showed 23% greater gains from mobile learning. These findings challenge dominant frameworks, such as SAMR and TPACK, which prioritize technological sophistication over accessibility and advocate for "frugal innovation" tailored to rural realities. Policy recommendations emphasize (1) offline-first digital infrastructure, (2) continuous teacher training with localized pedagogical support, and (3) community-embedded implementation to ensure sustainability. The study highlights the importance of equity-focused interventions, advocating for a paradigm shift from top-down technological deployment to participatory, context-driven models. Future research directions include longitudinal studies on programme sustainability and cost-benefit analyses of hybrid learning systems. By bridging the gap between policy ambitions and grassroots realities, this research contributes an actionable roadmap for inclusive digital education in low-resource settings.

Keywords: *Techno-pedagogy, Rural education, Digital divide, Hybrid learning, Teacher professional development*

Teacher professionalism in Sri Lanka: A comprehensive literature review on practices and challenges

R. G. T. S. Kumari, C. P. W. Malepathirana

Faculty of Education, University of Colombo, Sri Lanka

Teacher professionalism is a pivotal component in enhancing educational quality and school effectiveness. This systematic literature review (SLR) critically examines the practices and challenges associated with developing teacher professionalism in Sri Lanka, with a focus on School-Based Professional Teacher Development (SBPTD). Drawing on a comprehensive review of national and international literature, this study synthesizes conceptual frameworks, policy directions, and empirical findings related to SBPTD implementation in Sri Lankan government schools. Using the systematic literature review (SLR), 50 articles were selected, and among them finally 20 articles selected using the inclusion and exclusion criteria. The findings reveal that although SBPTD is endorsed in Sri Lankan education policies, its conceptualization and implementation vary across settings. Principals and teachers tend to view the concept as a continuous process to be implemented within schools through self-study rather than as a workshop conducted by an external party. The effectiveness of SBPTD is influenced by factors such as leadership quality, institutional culture, teacher agency and availability of resources. Moreover, the literature identifies a gap between policy intent and school-level practice, where SBPTD is often reduced to a compliance activity rather than a meaningful learning process. The review also highlights international best practices that promote teacher autonomy, peer collaboration and contextual learning principles that are underutilized in the Sri Lankan education system. This review highlights professionalism as directly linked to teachers' ability to make decisions, experiment with new methods, and take ownership of their professional growth. A key challenge is, though the success of School-Based Professional Teacher Development (SBPTD) is highly dependent on individual school principals, according to literature many leaders treat it as a "bureaucratic necessity," focusing on checklists and paperwork rather than fostering a genuine culture of inquiry and pedagogical improvement. By aligning it with global discourses, this study contributes to the theoretical understanding and practical advancement of teacher professionalism in Sri Lanka. It offers clear recommendations for education leaders, policymakers, and school practitioners seeking to improve professional development outcomes through localized, school-led approaches.

Keywords: *Teacher professionalism, School-based development, Professional learning, Sri Lanka, Educational reform*

Factors influencing teachers' motivation: Insights from the Anuradhapura education zone

K. Meera¹, R. Vijayatheepan²

¹*Faculty of Graduate Studies, University of Jaffna, Sri Lanka*

²*Department of Science & Technology Education, Faculty of Education,
University of Colombo, Sri Lanka*

Teacher motivation constitutes a critical determinant in the efficacy of educational systems. It facilitates student engagement and achievement and cultivates a constructive learning atmosphere and nurtures enduring intellectual curiosity. This study sought to elucidate the prevailing status of teacher motivation while identifying individual, institutional, and contextual determinants to inform the design of targeted and evidence-based interventions. Employing a mixed-methods approach within a descriptive survey framework, data were collected via structured questionnaires administered to a stratified random sample of 368 teachers within the Anuradhapura educational zone, complemented by in-depth interviews with 18 educators. Data analysis comprised descriptive statistics, Pearson correlation coefficients, independent samples t-tests, multiple regression analysis, and thematic analysis. The findings revealed elevated levels of intrinsic motivation, job satisfaction, favourable working conditions, and opportunities in professional development. Conversely, moderate to low levels were observed in relation to student behaviour, parental and community involvement, and external recognition, while remuneration structure was associated with markedly low motivational outcomes. Of the demographic variables examined, only gender demonstrated a statistically significant association with motivation levels; age, academic qualifications, tenure, school type, and student enrolment size did not yield significant correlations. Professional development opportunities and favourable work environments emerged as salient predictors of intrinsic motivation. In contrast, student behaviour, remuneration structure, parental and community involvement, and external recognition were not found to exert predictive influence on motivation. Based on these insights, the study delineates priority domains for strategic intervention: intrinsic motivation, job satisfaction, favourable working conditions, opportunities in professional development, student behaviour, remuneration structure, parental and community involvement, and external recognition. Future research is warranted to further interrogate the interrelationships and predictive validity of these variables to optimize motivational frameworks within the teaching profession.

Keywords: *Teacher motivation, Intrinsic motivation, Job satisfaction, Professional development, Remuneration structure*

Effectiveness of Student-Centered Learning Strategies in the teaching learning process in subjects of Sinhala and literature

R. A. S. P. Somarathne¹, S. S. Dahanayake²

¹*Faculty of Education, University of Colombo, Sri Lanka*

²*Department of Humanities Education, Faculty of Education, University of Colombo, Sri Lanka*

The main objective of this research is to create an activity framework for developing student-centered learning and teaching skills related to Sinhala Language and literature. The aim of this paper is to examine the student-centered learning strategies (SCLS) that can be effectively applied in the teaching and learning process, teachers' usage of effective positive psychological strategies in addressing psychosocial issues of secondary students, and a review of literature of Sinhala and literature. To achieve this, a mixed methods research approach was used, and a sample of 99 teachers and 300 students were selected through proportional random sampling. Quantitative data were collected through a teacher and student questionnaire, and qualitative data were collected through a documentary. Data analysis was conducted using both statistical and thematic analysis techniques. In the literature review, seven learning strategies related to Sinhala teaching were identified. Of the teachers, 52% indicated that they did not use all seven strategies in the teaching and learning process. Thirty nine activities were identified for implementing SCL, of which only 61% were used by teachers. Students confirmed that 66% of the activities mentioned by teachers were used in the classroom. Although 88% of teachers stated that they assess students and prepare appropriate activities, 13% of students stated that they never received feedback. Data revealed 35 challenges that were identified when implementing SCLS in the classroom. It can be concluded that there were various contradictions between teacher and student opinions and that there were still obstacles to implementing SCLS in Sri Lankan classrooms. It is suggested that a framework of activities with SCLS for teaching Sinhala language and literature should be developed and introduced, and continuous training should be provided to implement SCLS while minimizing obstacles.

Keywords: *Student-Centered Learning, Strategies, Teaching learning process, Language and literature*

Implementing CASEL's Three-Legged Stool for SEL in classrooms in Sri Lanka: A case study

F. Srimali, H. M. J. C. Herath

Department of Social Science Education, Faculty of Education, University of Colombo, Sri Lanka

Global research over recent decades has recognized the significant benefits of Social and Emotional Learning (SEL) for students' mental well-being and academic learning. Sri Lanka has also acknowledged the importance of SEL, but its implementation in schools, especially for Senior Secondary students aged 15-18 years, remains inadequate. The Collaborative for Academic, Social, and Emotional Learning (CASEL) offers a model for implementing SEL within classrooms, referred to as the 'Three-Legged Stool for SEL in Classrooms'. The stool represents SEL implementation in classrooms and stands on three legs which represent three approaches—supportive classroom environments, explicit instruction, and integration of SEL and academic instruction. This study aims to investigate how the Three-Legged Stool model can be implemented in classrooms in a national school in Sri Lanka. The study employed a Mixed Methods Case Study design and was conducted at a Type 1 AB school. First, a needs and readiness assessment was carried out, followed by the development of SEL programmes for Grades 10 and 12. These programmes were implemented over the course of one academic year. At the end of the school year, the overall impact of the SEL implementation was evaluated to determine the effectiveness of CASEL's model in the Sri Lankan context. Data were collected through questionnaires, feedback forms, interviews, and focus group discussions. Analysis utilized descriptive and inferential statistics, thematic and inductive analysis, descriptive narratives and triangulation. By exploring the implementation of SEL based on a globally accepted model, this study aims to support the development of national policies that encourage schools to initiate SEL programmes and address the critical need for SEL among students in Sri Lanka.

Keywords: *SEL, CASEL's Three-Legged Stool, Senior secondary, Social, Emotional*

FACULTY OF GRADUATE STUDIES



Resilience and Innovation through Multidisciplinary Research

21st November 2025

MESSAGE FROM THE DEAN

Professor A. A. Azeez

*Faculty of Graduate Studies
University of Colombo
Sri Lanka*



It is with great pleasure that I issue this message for the Annual Research Conference 2025, organized by the Faculty of Graduate Studies of the University of Colombo, which is a thriving institution that promotes postgraduate studies and multidisciplinary research in Sri Lanka. I strongly believe that this year's conference theme, 'Resilience and Innovation through Multidisciplinary Research,' has meaningful implications for understanding the role of multidisciplinary research in addressing the real-world problems we confront today. Multidisciplinary research fosters holistic solutions, innovation, and the professional growth of research scholars, ultimately driving social advancement and economic development. In this backdrop, I have the greatest pleasure that this conference creates an opportunity for both international and local scholars to exchange their research findings and to promote a culture of multidisciplinary research.

I take this opportunity to acknowledge the guidance and support given by various individuals to make the Annual Research Conference 2025 a success. First and foremost, I would like to extend my sincere thanks to Professor Indika Karunathilake, Vice-Chancellor of the University of Colombo, for his unwavering support and valuable guidance in making this conference a reality. I am immensely thankful to the keynote speakers, Professor Philip Yu, Dr. Ba Shen from the Education University of Hong Kong, and Professor Simrit Kaur from the University of Delhi, for their generosity in sharing valuable insights and for promoting multidisciplinary research through their keynote speeches. I should also express my sincere appreciation to the co-chairs of the conference, Professor S. C. Padmakumara and Dr. Nuradhi K. Jayasiri, whose unwavering dedication has been vital in organizing this conference.

Finally, I convey my heartiest wishes and gratitude to the advisory committee of the conference, programme coordinators, all paper presenters, panel of reviewers, session chairs, staff of the faculty including administrative officers and the organizing committee for their dedication and commitment to make this conference a success. I hope this conference stimulates new ideas, multidisciplinary dialogue, and long-term academic collaborations.

MESSAGE FROM THE CONFERENCE CO-CHAIRS



Professor S. Chaminda Padmakumara

*Department of International Relations
Faculty of Arts
University of Colombo, Sri Lanka*



Dr. Nuradhi K. Jayasiri

*Department of Accounting
Faculty of Management and Finance
University of Colombo, Sri Lanka*

With great pleasure, we welcome you to the Annual Research Conference (ARC) 2025, organized by the Faculty of Graduate Studies, University of Colombo, Sri Lanka. This year's theme, “Resilience and Innovation through Multidisciplinary Research”, celebrates not only the spirit of academic perseverance but also the transformative power of collaboration across diverse fields of inquiry. We hope that the studies presented at this conference will provide necessary theoretical and practical insights into this aspect. In a world marked by rapid change, uncertainty, and complex global challenges, resilience and innovation have emerged as critical pillars for advancing knowledge and driving meaningful impact. As many scholars and professionals are expected to attend the conference, we strongly believe that this conference will present innovative solutions to the common challenges we encounter today through diverse disciplinary lenses, perspectives, and methodologies.

This conference brings together graduate students, faculty, and local and international scholars from across departments, universities and institutes, showcasing the strength and creativity that emerge when boundaries are crossed, and new connections are forged. We are extremely happy to co-chair this vibrant gathering of minds. ARC 2025 would not have been possible without the assistance and guidance of many. We would like to extend our gratitude to Professor Indika Karunathilake, Vice-Chancellor of the University of Colombo, Professor A. A. Azeez, the Dean of the Faculty of Graduate Studies, keynote speakers, members of the advisory committee, staff of the faculty, organizing committee, track chairs, coordinators, session chairs, panel of reviewers. There is no conference without participants and authors. Therefore, we especially acknowledge and value all authors who submitted their research work to ARC 2025. Thank you for participating in this conference dedicated to making resilience and innovation a reality through multi-disciplinary research. We wish you an enriching and productive research experience at the Annual Research Conference - 2025.

ORGANIZING COMMITTEE

Advisory Committee	Prof. A. A. Azeez (Dean, Faculty of Graduate Studies)
	Prof. M. P. P. Dharmadasa (Director of Studies (Research), Faculty of Graduate Studies)
	Prof. K. Dissanayake (Director of Studies (Study Programmes), Faculty of Graduate Studies)
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	Ms. A. U. Gallage (Deputy Bursar, Faculty of Graduate Studies)

CONFERENCE PROGRAMME

9.00 am – 9.30 am	Registration and Morning Tea
9.30 am – 10.00 am	Commencement of the Inaugural Ceremony
10.00 am – 10.10 am	Welcome Address <i>Prof. A. A. Azeez</i> <i>Dean, Faculty of Graduate Studies</i> <i>University of Colombo</i>
10.10 am – 10.20 am	Address by the Chief Guest <i>Prof. Indika Karunathilake</i> <i>Vice-Chancellor, University of Colombo</i>
10.20 am – 10.50 am	Keynote Address – I <i>Prof. Philip Yu</i> <i>Facility of Data Science and Artificial Intelligence</i> <i>Education University of Hong Kong</i>
10.50 am – 11.00 am	Cultural Item
11.00 am – 11.20 am	Keynote Address – II <i>Prof. Simrit Kaur</i> <i>Principal, Shri Ram College of Commerce</i> <i>University of Delhi</i>
11.20 am – 11.30 am	Cultural Item
11.30 am – 11.50 am	Keynote Address – III <i>Dr. Ba Shen</i> <i>Department of Curriculum and Instruction</i> <i>Education University of Hong Kong</i>
11.50 am – 12.00 pm	Vote of Thanks
12.00 pm – 1.00 pm	Conference Lunch
1.00 pm – 3.00 pm	Technical Sessions
3.00 pm – 3.15 pm	Tea Break
3.15 pm – 5.00 pm	Technical Sessions and End of the Conference

INTRODUCTION TO THE KEYNOTE SPEAKER – I

Professor Philip Yu

*Department of Mathematics and Information Technology
The Education University of Hong Kong (EdUHK)
Hong Kong*



Philip Yu is a Professor at the Department of Mathematics and Information Technology and serves as the Associate Director of the University Research Facility of Data Science and Artificial Intelligence at The Education University of Hong Kong. His recent research interests include preference learning, data mining in STEM education, time series analysis, multimodal AI and its applications in education and healthcare. He has authored over 150 publications and two well-received research monographs on ranking methodology and has been awarded gold medals in several international invention competitions.

Professor Yu is dedicated to exemplary teaching and mentoring, providing outstanding service to the statistics and data science fields through numerous conferences and committee work. He actively promotes statistical and AI literacy in Hong Kong through outreach initiatives. With more than three decades of extensive experience, he has contributed to numerous contracted research/consulting projects and professional services for businesses, industries, and public bodies, including banks and insurance companies, stock exchanges, the Education Bureau, the Hong Kong Examinations and Assessment Authority, the Department of Health, the Hospital Authority, the Census and Statistics Department, and secondary schools.

ABSTRACT OF THE KEYNOTE ADDRESS – I

AI and Generative AI in Medicine and Education

Professor Philip Yu

*Department of Mathematics and Information Technology
The Education University of Hong Kong*

Artificial Intelligence (AI) and Generative AI (GenAI) have emerged as transformative tools, effectively addressing a wide array of everyday challenges. Their applications span various fields, significantly impacting our daily lives and reshaping industries. In this keynote presentation, I will showcase several innovative, multidisciplinary AI/GenAI projects in the realms of medicine and education, including (1) deep learning-based medical image analysis, (2) multimodal AI-powered language learning, and (3) GenAI-assisted immersive learning through virtual escape rooms.

The first project focuses on developing deep learning algorithms capable of rapidly evaluating medical images for various diseases. These algorithms can segment tumor lesions, predict the likelihood of stroke, and assess the risk of disease recurrence. By automating these processes, we aim to enhance the efficiency and accuracy of medical diagnoses, ultimately improving patient outcomes.

In the second project, we leverage fine-tuned multimodal AI models to support language learning. As students observe and describe common objects and situations, the system analyses visual images to automatically generate relevant learning content, including vocabulary, sentences, and dialogues. Moreover, the AI system evaluates students' responses in real-time, providing immediate feedback. This interactive human-machine engagement not only helps students improve their English writing skills but also fosters a more personalized learning experience.

The third project explores the concept of virtual escape rooms--interactive, live-action games where players uncover clues, solve puzzles, and answer questions to achieve a specific objective, typically escaping from the room. Unlike traditional physical escape rooms, virtual escape rooms can be accessed from anywhere, offering unique interaction modes that are often impractical in real-world settings. A well-designed virtual escape room can create an immersive and engaging learning environment, boosting student engagement and motivation. This project aims to develop a virtual escape room game that leverages GenAI technology to facilitate interactive communication and provide personalized feedback throughout the gameplay.

INTRODUCTION TO THE KEYNOTE SPEAKER – II

Professor Simrit Kaur

*Professor of Economics and Public Policy
Principal of Shri Ram College of Commerce (SRCC)
University of Delhi
India*



Professor Simrit Kaur is the Principal of Shri Ram College of Commerce (SRCC), University of Delhi. Prior to joining SRCC, Prof. Kaur was with the Faculty of Management Studies, University of Delhi. A trained Economist, Prof. Kaur also guides research scholars in areas of Development Economics, Environmental Economics, Disinvestment and Mergers & Acquisitions. In her capacity as an Independent Director in DCM Shriram Limited and Indraprastha Gas Limited, Prof. Kaur also has expertise in building industry-academic linkages.

Nominated by the Indian Council of Cultural Relations, Dr. Kaur has been a 'Visiting Professor' at the University of Social Sciences and Humanities, Ho Chi Minh City, Vietnam and a 'Visiting Scholar' at Kingston University, London. She has also participated in the International Teachers Programme held at the Kellogg School of Business, Chicago. Dr. Kaur has undertaken several research projects and acted as an advisor to institutes and organizations such as the Ministry of Finance, Government of India; the Ministry of Heavy Industries and Public Enterprises, Government of India; the Competition Commission of India (CCI); the National Council of Applied Economic Research (NCAER); the Organisation for Economic Cooperation and Development (OECD); International Fund for Agricultural Development (IFAD), and the Food and Agriculture Organization (FAO) of the United Nations. Her areas of interest include agricultural policy, poverty and food security, economic freedom, privatization, productivity, and competition. In addition, she has published and presented several papers at national and international conferences. Dr. Kaur's book 'Privatization and Public Regulation: The Indian Experience', published by Macmillan received the Best Book Award. Some of her papers have also won the Best Paper Award. Being the Principal of the Best College in Commerce Education, Prof. Kaur has the experience and skills required for professional success and growth of an institute.

ABSTRACT OF THE KEYNOTE ADDRESS – II

Resilience and Innovation through Multidisciplinary Research

Professor Simrit Kaur

Principal of Shri Ram College of Commerce (SRCC)

University of Delhi, India

“We cannot solve our problems with the same thinking we used when we created them.”

Albert Einstein

It gives me immense pleasure to address this august gathering at the Annual Research Conference 2025, jointly organized by the Office of International Programmes, Shri Ram College of Commerce, University of Delhi, India, and the Faculty of Graduate Studies, University of Colombo, Sri Lanka. This collaboration between two leading institutions reflects our shared commitment to advancing knowledge, fostering innovation, and nurturing global academic partnerships.

The insights of Einstein resonate profoundly in our current era, as the world confronts a confluence of crises, including *climate change*, *conflicts*, pandemics, and technological disruptions, each necessitating innovative thinking and collective wisdom. The path forward is characterized by resilience, driven by innovation and enriched through multidisciplinary research. *Resilience* transcends mere endurance, emphasizing adaptation and transformation. Innovation serves as a critical resource, transforming adversity into opportunity, a lesson indelibly taught by the *COVID-19 pandemic*. No single discipline, be it medicine, economics, or data science, could have addressed the pandemic in isolation. It was through the integration of epidemiology, technology, behavioural psychology, logistics, and policy science that nations were able to track infections, develop vaccines, manage supply chains, and communicate effectively with citizens. This exemplifies the real-time success of multidisciplinary research. India's trajectory in recent years exemplifies the collaborative potential of policy, technology, and academia in fostering resilience. The government's comprehensive stimulus package during the COVID-19 pandemic was designed not only to stimulate demand but also to enhance long-term capacity by supporting micro, small, and medium enterprises (MSMEs), agricultural reforms, digitalization, and infrastructure investment. The emphasis on ‘Aatmanirbhar Bharat’ marked a shift from dependency to self-reliance, promoting innovation across various levels, from startups to social enterprises. The underlying message was unequivocal: sustainable recovery necessitates inclusivity, knowledge-driven approaches, and cross-sectoral collaboration. Within this framework, the *National Education Policy* (NEP 2020) emerges as visionary, reconceptualizing higher education as a multidisciplinary, research-oriented ecosystem. It advocates for universities to transition from mere degree-granting entities to knowledge-generating communities, where engineers learn from economists, data scientists

collaborate with sociologists, and environmentalists engage with entrepreneurs. The proposed National Research Foundation (NRF) and the integration of arts, sciences, and technology into a holistic curriculum are strategic measures to cultivate innovation that is both intellectually rigorous and socially pertinent. NEP 2020 aptly acknowledges that the future belongs to those capable of connecting ideas across disciplines.

The integration of *Artificial Intelligence* (AI) with sustainability exemplifies a transformative approach. AI is significantly advancing food security, addressing one of humanity's most pressing challenges. AI-driven precision agriculture enhances the efficiency of fertilizer and water usage, mitigates crop diseases through drone-based imaging, and fortifies early-warning systems for climate-related disruptions. In India, platforms such as Fasal, AgNext, and IntelloLabs employ the Internet of Things (IoT), machine learning, and blockchain technology to ensure productivity, transparency, and equitable pricing throughout the food supply chain. These innovations are not isolated occurrences but rather emerge from interdisciplinary collaboration, where agronomy intersects with computer science, and economics aligns with environmental ethics. On a global scale, the United Nations' *Sustainable Development Goals* (SDGs) underscore the interconnectedness of hunger, poverty, health, and climate action. Achieving these goals necessitates research that transcends national and international boundaries. The future resilience of food systems, public health, and education hinges on our ability to co-create knowledge across disciplines and sectors. For India, this vision holds exceptional promise. The nation's demographic dividend, digital infrastructure, and intellectual capital uniquely position it to spearhead this new wave of research-driven innovation. Universities must therefore function as dynamic laboratories, where ideas are tested, policies are informed by evidence, and students are prepared not merely for employment but for problem-solving in a complex world. To conclude, resilience and innovation are not competing virtues; rather, they are complementary forces. One provides strength, the other direction. Together, they shape the future of nations and humanity itself. Ultimately, resilience is cultivated not by what we endure, but by what we collectively reinvent.

INTRODUCTION TO THE KEYNOTE SPEAKER – III

Dr. Shen Ba

Assistant Professor

Department of Curriculum and Instruction

The Education University of Hong Kong (EdUHK)

Hong Kong



Dr. Ba is an Assistant Professor in the Department of Curriculum and Instruction at The Education University of Hong Kong (EdUHK). He received his Ph.D. in Educational Technology from Central China Normal University, where he also undertook a period as a visiting scholar in the Department of Educational Studies at The Ohio State University, USA. Prior to joining EdUHK, Dr. Ba served as a post-doctoral fellow and part-time lecturer in the Faculty of Education at the University of Hong Kong.

Dr. Ba's research interests are at the intersection of education and information technology, with a particular emphasis on leveraging learning analytics in online learning environments. His recent work explores the integration of generative AI (GenAI) in collaborative inquiry, aiming to advance both developmental learning assessment and our understanding of the fine-grained cognitive and social processes that underpin complex collaborative processes.

Dr. Ba serves on the editorial boards of several leading international journals, including Computers & Education, British Journal of Educational Technology, and Humanities & Social Sciences Communications (Nature). He is also one of the founding members of EdUHK's Global Institute for Emerging Technologies, which seeks to foster interdisciplinary collaboration and innovation in educational research and practice.

ABSTRACT OF THE KEYNOTE ADDRESS – III

Transforming Collaborative Inquiry: Opportunities and Challenges of Generative AI-Assisted Feedback

Dr. Shen Ba

Department of Curriculum and Instruction

The Education University of Hong Kong (EdUHK), Hong Kong

The rapid adoption of generative artificial intelligence (GenAI) is transforming educational feedback, particularly within collaborative inquiry environments where learners co-construct knowledge through sustained communication and interaction. As GenAI tools become increasingly capable of sustaining meaningful interactions and delivering nuanced feedback, educators and researchers are prompted to reconsider not only the technological advancements but, importantly, the ways in which these tools shape learner experiences. Recent studies indicate that GenAI-assisted feedback can flexibly address a range of feedback foci—from task-specific guidance to the promotion of self-regulatory skills—while providing support at varying levels of complexity. When thoughtfully designed and integrated, such feedback has been shown to enhance behavioural and social engagement, stimulate knowledge construction, and foster the co-development of ideas in collaborative inquiry.

However, integrating GenAI-assisted feedback into collaborative inquiry is not without its challenges. Distinct feedback orientations, such as idea-oriented versus task-oriented guidance, appear to influence both the cognitive depth and the emotional dynamics of group interactions. While idea-oriented feedback may encourage deeper exploration and critical reflection, it can also elicit stronger emotional responses, highlighting the importance of sensitive feedback design and delivery. Furthermore, the effectiveness of GenAI-assisted feedback depends on factors such as transparency, clarity of the underlying algorithms, and alignment with pedagogical intentions—elements that are not consistently addressed in current practice.

Drawing on emerging empirical evidence, this presentation examines the mechanisms by which GenAI-assisted feedback operates in collaborative inquiry contexts, emphasizing both its transformative potential and inherent complexities. A conceptual model is introduced to frame the dynamic interplay between technology, pedagogy, and learner agency. Ultimately, the session advocates for a balanced, learner-centered approach to GenAI integration—one that prioritizes transparency, emotional sensitivity, and authentic collaboration as foundational principles for the future of educational feedback.

LIST OF ABSTRACTS

Higher-order cognitive skills among entry-level IT professionals in Sri Lanka: Industry expert's point of view <i>P. H. A. U. De Silva, K. P. Hewagamage, R. A. B. Abeygunawardana</i>	301
Hypolipidemic potential of Ayurveda drug formula in lipid induced rats <i>A. P. A. Jayasiri, W. D. Ratnasooriya</i>	302
The Basel Convention's role in managing transboundary hazardous waste: Based on California-Mexico case study <i>A. De Silva</i>	303
Open innovation practices on innovation performance of IT startups in Sri Lanka <i>W. A. M. Fernando, R. Senathiraja</i>	304
Career expectations of Gen Zs on their career decision-making intentions: An empirical study in Sri Lanka <i>K. A. D. U. Jayatissa, K. Dissanayake</i>	305

Higher-order cognitive skills among entry-level IT professionals in Sri Lanka: Industry expert's point of view

P. H. A. U. De Silva¹, K. P. Hewagamage², R. A. B. Abeygunawardana³

¹*Faculty of Graduate Studies, University of Colombo, Sri Lanka*

²*University of Colombo School of Computing, Sri Lanka*

³*Department of Statistics, Faculty of Science, University of Colombo, Sri Lanka*

Higher-Order Cognitive Skills (HOCS) refers to progressive mental processes which improve an individual's skills on analyzing complex problems critically, creating varied perspectives based on different viewpoints, evaluating problems in multifaceted ways, and creating innovative advanced solutions. Hence HOCS which include analysis, evaluation, problem-solving, and creative thinking are recognized as essential competencies for entry level IT professionals who have to handle complex and dynamic technological environments. The main objective of this study is to explore the perceived adequacy of HOCS among newly employed IT graduates from the perspective of industry experts. By quantitative survey questionnaire approach, data were collected from immediate supervisors of newly recruited IT graduates across leading thirty SLASSCOM registered IT companies. The findings reveal an overall minor level of satisfaction with HOCS, demonstrated by recently graduated IT professionals. Logical reasoning skill was rated as adequate but analytical skill was generally rated as significantly less adequate. All findings align with similar types of technical work such as using an agile project management method for fulfilling identified objectives. Gaps were identified in essential HOCS for IT professionals in innovation solution-based projects such as creative problem solving, critical evaluation, and adaptive thinking skills. IT professionals highlighted that graduates properly perform assigned tasks within structured decisions and frameworks. However, they struggle to deal with semi-structured and unstructured decisions and frameworks independently formulating for optimal solutions particularly in systems integration, project design and implementation and stakeholder's requirements and experience enhancement. Overall, the study underlines the most important higher-order cognitive skills IT professionals' entire lifelong activities. Conclusion of this study is problem-solving, and critical thinking skills are most relevant HOCS and to address the identified gaps, it is authoritative for IT education to develop structured pedagogical approaches with integrate real-world problem-based learning, and reflective assessments to methodically encourage identified skills.

Keywords: *Higher-Order Cognitive Skills (HOCS), Recent IT graduates, IT professionals, IT education, Pedagogical approaches*

Hypolipidemic potential of Ayurveda drug formula in lipid induced rats

A. P. A. Jayasiri¹, W. D. Ratnasooriya²

¹*Department of Ayurveda Pharmacology, Pharmaceutics and Community Medicine, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

²*Department of Zoology and Environment Sciences, Faculty of Science, University of Colombo, Sri Lanka*

Lipid disorders are described as Medoroga in the Ayurveda system of medicine. Different herbal and herbomineral preparations are used to treat this disease condition. Among them Arogyavardhanee vati: pill (AV) is one formula known to control high blood glucose levels and cholesterol levels. The objective of the study was to evaluate the lipid lowering activity of AV in hyperlipidemic rats by comparing its activity with reference hypolipidemic drugs, Simvastatin (ST) and Lipicard (LI). The drug, prepared according to Ayurveda Pharmacopeia of Sri Lanka, was purchased from Ayurvedic Drugs Corporation and used in this study. Adult Wistar rats were purchased from the Medical Research Institute and were made hyperlipidemic by giving them a high fat diet (HFD) mixture prepared by thoroughly mixing egg yolk (40 g) and Anchor butter (10 g) for 10 min. Prepared HFD was orally administered using feeding tubes at 10 h intervals for 14 consecutive days while the control group for 28 days. The blood samples were collected, and serum lipid profiles were determined using Randox lipid profile assay kits. The rats with total cholesterol levels greater than 100 mg/dL were selected as lipid induced rats. Lipid induced rats were randomly divided into groups (n=9). Test drugs were administered to lipid induced rats as AV 34 mg, ST 1 mg, LI 6 mg twice a day, morning and evening, for a further 14 consecutive days and serum lipid profiles were estimated using assay kits. Percentage values of increase in cholesterol levels in lipid induced stage, and in reduction of blood lipid profile levels in drug treated groups were calculated and analyzed using Mann-Whitney U-test and significance compared with the control at ($p < 0.05$). Total cholesterol levels (105 mg/dL) of lipid induced rats were decreased by AV in 49.3% compared to 48.3% and 27.6% by reference drugs ST and LI respectively. Triglyceride levels were reduced in a similar manner: 62%, 61%, 60% by administered drugs AV, ST and LI respectively. Results revealed that AV pill has good lipid lowering activity. This lipid lowering potential is similar to ST and LI. It can be concluded that AV pill is an effective drug for managing lipid disorders.

Keywords: *Lipid lowering, Medoroga, Herbomineral, Hyperlipidemic*

The Basel Convention's role in managing transboundary hazardous waste: Based on California-Mexico case study

A. De Silva

Department of International Relations, Faculty of Arts, University of Colombo, Sri Lanka

The Basel Convention on the control of transboundary movements of hazardous wastes and their disposal plays a crucial role in regulating the management of hazardous waste, especially in contexts where environmental and public health concerns intersect across national borders. This research examines the application and effectiveness of the Basel Convention through the lens of a California-Mexico case study involving a transboundary hazardous waste issue. The research problem centers on the challenges posed by illegal and unregulated shipments of hazardous waste. The transboundary movement of hazardous waste between California and Mexico exposes significant regulatory failures and environmental degradation, also reflecting weaknesses in international law enforcement and bilateral cooperation. The primary objective of this research is to assess how international law, particularly the Basel Convention, alongside complementary regional agreements like the La Paz Agreement, addresses this hazardous waste challenges to prevent environmental harm and protect human health. Methodologically, this study employs a qualitative research approach, relying primarily on secondary data sources. This research involves international treaties, scholarly articles, internet sources etc. Also, research analysis based on the case study method is used to examine specific case studies and this analysis is framed using public international law principles as parameters. Thus, this research approach allows a comprehensive understanding of both the legal frameworks and their practical implications in managing hazardous waste across borders. Major research findings reveal that the United States exports significant hazardous waste to Mexico due to stricter domestic disposal laws, creating environmental and health risks in Mexican border communities. Despite the existence of the International Basel Convention and regional agreements like the La Paz Agreement, practical enforcement remains weak due to asymmetrical regulatory capacities, limited resources, and insufficient political will. Also, case studies demonstrate unregulated hazardous waste shipments have led to health risks from toxic exposure for Mexican communities, breaching international law principles of sovereign equality and territorial integrity. Finally, strengthening legal accountability for individuals and states involved in illegal California-Mexico hazardous waste trade is crucial to uphold international law and ensure sustainable environmental practices. Also, this study concludes that bridging the gap between legal frameworks and real-world enforcement requires U.S. ratification of the Basel Convention, increased funding and technical assistance for Mexico, enhanced data transparency, stronger enforcement mechanisms, and a stronger commitment to the polluter-pays and precautionary principles to effectively safeguard public health and the environment.

Keywords: *Basel Convention, Transboundary hazardous waste, Principles of international law, California-Mexico border, Bilateral cooperation*

Open innovation practices on innovation performance of IT startups in Sri Lanka

W. A. M. Fernando¹, R. Senathiraja²

¹*Faculty of Graduate Studies, University of Colombo, Sri Lanka*

²*Department of Management & Organization Studies, Faculty of Management & Finance, University of Colombo, Sri Lanka*

The IT sector is a key driver of economic growth. Sri Lankan IT startups face significant hurdles in innovating and competing globally. This study examines the effect of open innovation practices on the innovation performance of IT startups in Sri Lanka. It addresses the status, impact, and challenges of open innovation practices on the innovation performance of IT startups. The research employs a mixed-methods design, and data was collected through piloted and validated questionnaires and structured interviews. The total population consisted of 822 individuals, and a sample of 312 startups. The study employs random sampling methods and a survey strategy to collect data. Additionally, five founders of these startups were selected for the interview. The findings show that IT startups receiving funds at an early stage dominate, with Pre-seed and Seed funding leading significantly, highlighting challenges in scaling and accessing advanced financial backing. In addition, both outside-in and inside-out open innovation significantly increase innovation performance in Sri Lankan IT startups, with R&D cooperation intensity as a key moderator. Furthermore, the findings underscore how startups interact with external stakeholders, including academic institutions, technology partners, and customers, to drive innovation and remain competitive in the Sri Lankan business landscape. Key practices include collaboration with universities for knowledge sharing, customer-driven innovation to align products with market needs, sustainability-focused initiatives, and data-driven decision-making. However, research illustrates that startups encounter several challenges, including stringent government regulations on data privacy and cyber security, environmental compliance costs, labour laws, and complexities in intellectual property protection.

Keywords: *Start-up, IT start-up, Open innovation, Open innovation practices, Open innovation performance, Cooperation intensity*

Career expectations of Gen Zs on their career decision-making intentions: An empirical study in Sri Lanka

K. A. D. U. Jayatissa¹, K. Dissanayake²

¹*Faculty of Graduate Studies, University of Colombo, Sri Lanka*

²*Department of Management & Organization Studies, Faculty of Management & Finance,
University of Colombo, Sri Lanka*

Generation Z (Gen Z) individuals, possessing distinct career expectations and aspirations that differ from those of previous generations, are increasingly entering the workforce. Career expectations encompass individuals' beliefs and anticipations regarding their future professional decisions, shaped by both subjective perceptions and objective considerations. While existing research has focused on factors related to career expectations of employees, such as rewards and job security, the influence of intrinsic and altruistic values, as well as the work environment, remains less well understood. Moreover, existing theories, including expectancy theory, psychological contract theory, equity theory, and social cognitive career theory, have not fully explained which career expectations drive these intentions, particularly for Gen Z in contemporary organizations. This study addresses this gap by integrating Social Cognitive Career Theory (SCCT) and Affective Events Theory (AET) to examine the cognitive, social, and emotional drivers of Gen Z's career expectations. Based on this integrated framework, the study aims to identify the career expectations of Gen Z that shape their career decision-making intentions. Five hypotheses were proposed examining the impact of rewards, intrinsic values, altruistic values, job stability, and work environment on Gen Z's career decision-making intentions. Adopting a positivistic, deductive, and quantitative approach, data were collected through a self-administered questionnaire from Gen Z employees in the IT-BPM sector in Sri Lanka. Quota sampling ensured the inclusion of participants based on age, employment status, and geographic location, while excluding foreign nationals and non-English speakers. Career decision-making intentions were measured using a six-item scale, and career expectations were measured across five dimensions, including rewards, intrinsic and altruistic work values, job stability, and work environment. Empirical findings reveal that Gen Z's career expectations are shaped by a complex interplay of intrinsic and extrinsic factors, with rewards, job stability, and work environment significantly influencing career decision-making intentions. The study contributes theoretically by integrating cognitive and affective perspectives for understanding career expectations of Gen Z individuals and provides practical implications for organizations. In particular, human resource managers can leverage these insights to develop strategies for attracting, engaging, and retaining Gen Z talent. Ultimately, by addressing the determinants of Gen Z's career expectations, organizations can refine recruitment, development, and retention practices to better align with the expectations of the Gen Z workforce.

Keywords: *Career expectations, Career decision-making intentions, Gen Z, Sri Lanka*

FACULTY OF MANAGEMENT AND FINANCE



31st October 2025

MESSAGE FROM THE DEAN

Professor H. M. Nihal Hennayake

*Faculty of Management and Finance
University of Colombo
Sri Lanka*



It is with great pleasure that I extend my message for the Annual Research Symposium (ARS) 2025, organized by the University of Colombo under the theme “Research for Resilience: Advancing Knowledge in a Changing World.” This year’s theme reflects the University’s unwavering commitment to fostering innovative and impactful research that addresses the challenges and opportunities of an ever-evolving global landscape. The University of Colombo continues to uphold its reputation as a leading centre of academic excellence, maintaining its position among the top 1000 universities globally, as recognized by renowned university ranking systems. This achievement is a testament to our dedication to quality teaching, research, and knowledge dissemination across diverse disciplines.

As part of this broader institutional mission, the Faculty of Management and Finance remains at the forefront of advancing scholarly inquiry in Business and Management. The faculty continues to promote a vibrant research culture through its own annual research events, including the International Research Conference on Management and Finance (IRCMF), which will be held for the 20th consecutive year in 2025, along with the Doctoral Colloquium and Industry Dialogue. These initiatives serve as key platforms for collaboration between academia, industry, and policymakers. I take this opportunity to extend my warmest wishes to all researchers contributing to the Annual Research Symposium 2025. May your work inspire resilience, creativity, and knowledge that contribute meaningfully to national and global progress.

I wish the Annual Research Symposium (ARS) 2025 every success.

ORGANIZING COMMITTEE

Ms. H. G. I. Madhushani (Lecturer (Probationary), Department of Accounting, Faculty of Management and Finance)

Mr. V. S. Batagoda (Assistant Lecturer, Department of International Business, Faculty of Management and Finance)

Mr. S. D. K. Wickramasinghe (Assistant Lecturer, Department of Marketing, Faculty of Management and Finance)

Ms. A. M. M. H. B. Abeysinghe (Assistant Lecturer, Department of Business Economics, Faculty of Management and Finance)

SYMPOSIUM PROGRAMME

Mode: Online (via Zoom)

31st October 2025

10.00 am – 10.05 am	Opening and Welcome Remarks
10.05 am – 10.10 am	Address by the Dean, Faculty of Management and Finance <i>Prof. H. M. Nihal Hennayake</i>
10.10 am – 10.15 am	Introduction to the Technical Session <i>Mr. V. S. Batagoda</i>
10.15 am – 11.15 am	Presentations (Abstracts)
11.15 am – 11.45 am	Break
11.45 am – 12.45 pm	Presentations (Abstracts)
12.45 pm – 12.50 pm	Concluding Remarks and Vote of Thanks

LIST OF ABSTRACTS

Acculturation and purchase intention for Japanese food: The mediating role of consumer ethnocentrism of expatriates in Japan <i>B. V. S. Mekhala, H. K. D. K. Fernando</i>	312
Contribution of Gig-economic activities to the Shadow GDP in Sri Lanka <i>A. M. M. H. B. Abeysinghe</i>	313
Optimizing inventory management in ABC beverage company: A focus on minimizing expiry in export stock <i>S. S. Kumararathna, U. Manathunga, C. K. Perera, V. Batagoda</i>	314
Resilience development process of Sri Lankan employees in response to polyadversity <i>R. Razik, P. Kailasapathy</i>	315
The impact of Foreign Family Supportive Supervisor Behaviour on work-life balance: Moderating role of cultural intelligence <i>M. N. M. Najar, P. C. Gamage</i>	316
The impact of internationalism on consumer ethnocentrism and purchase intentions: The moderating role of consumer personality among Sri Lankan consumers <i>L. Chethana, N. H. M. S. M. Herath</i>	317
The impact of westernization on intention for green consumption among Gen Z consumers: The mediating role of status-driven consumption <i>M. A. S. Navoda, H. K. D. K. Fernando</i>	318
The impact of workplace diversity climate on perceived overqualification and career satisfaction: Moderating role of motivation of migrant employees <i>G. N. Wijesooriya, P. C. Gamage</i>	319

Acculturation and purchase intention for Japanese food: The mediating role of consumer ethnocentrism of expatriates in Japan

B. V. S. Mekhala, H. K. D. K. Fernando

*Department of International Business, Faculty of Management and Finance,
University of Colombo, Sri Lanka*

This study intends to investigate the complicated relationship between the acculturation process of expatriates and their purchase intentions for food products of the host country. Furthermore, the study examines the mediating impact of consumer ethnocentrism towards the host country in the relationship between acculturation and purchase intention for host country food. According to the International Organization of Migration (IOM, 2024), 3.6% of the entire world population constitutes international migrants who represent a significant portion of the consumer segment in host countries. Therefore, this study investigates whether highly adapted expatriates demonstrate deep ethnocentrism toward their host country's products. As the main theoretical lens of this study, Consumer Culture Theory is used. For this study, data were collected through an online self-administered questionnaire from 162 expatriates living in Japan and SPSS 22 was utilized to analyze the gathered data. The major findings indicate that acculturation positively influences both consumer ethnocentrism and purchase intention. Consumer ethnocentrism also shows a significant positive impact on purchase intention. Moreover, mediating analysis reveals that consumer ethnocentrism towards the host country partially mediates the relationship between acculturation and purchase intention. By highlighting the role of consumer ethnocentrism in shaping purchasing decisions, this study provided valuable insights for international marketers focusing on effectively engaging with expatriates and adjusting their strategies accordingly. Eventually, this study bridges the gap between acculturation theories and consumer behaviour, contributing a remarkable view on how expatriates negotiate their dual identities in their host country.

Keywords: *Acculturation, Expatriates, Consumer ethnocentrism, Consumer culture theory, Japanese food*

Contribution of Gig-economic activities to the Shadow GDP in Sri Lanka

A. M. M. H. B. Abeysinghe

*Department of Business Economics, Faculty of Management and Finance,
University of Colombo, Sri Lanka*

The rapid growth of gig-based work in Sri Lanka, spanning from freelance services, delivery platforms, and online content creation has outpaced traditional economic measurement systems, leading to significant underreporting in official Gross Domestic Production (GDP) figures. Global evidence from the IMF, World Bank, and leading scholars such as Friedrich Schneider and Andreas Buhn demonstrates that informal and gig-based activities contribute between 15% and 40% of total GDP in many developing economies, underscoring the significance of assessing their economic value. This study investigates the contribution of the gig economy to Sri Lanka's unreported or shadow GDP by the Proxy Estimation Method (Gap Analysis). The selection of this method is supported by studies from countries such as Greece, Nepal, and Malaysia, where gap analysis techniques have been successfully used to estimate the size of the shadow economy by comparing labour participation and reported GDP. It compares observed labour force participation in gig-type activities, as reported by national surveys, against the corresponding economic output recorded in national accounts. Estimated earnings derived from sector-specific income benchmarks are contrasted with reported sectoral GDP, with the difference serving as a proxy for unreported contributions. The analysis draws upon data from the Department of Census and Statistics (DCS), Labour Force Surveys (LFS), and Central Bank of Sri Lanka (CBSL) national accounts, complemented by insights from global and local gig platform activity. The findings aim to quantify the hidden economic value generated by gig workers, highlight structural gaps in current economic measurement frameworks, and provide evidence-based recommendations for integrating gig economy activity into formal national accounts.

Keywords: *Shadow GDP, Gig-economy*

Optimizing inventory management in ABC beverage company: A focus on minimizing expiry in export stock

S. S. Kumararathna, U. Manathunga, C. K. Perera, V. Batagoda

*Department of International Business, Faculty of Management and Finance,
University of Colombo, Sri Lanka*

In a competitive environment such as global beverage exports, effective inventory management is essential to remain profitable and minimize waste. This study investigates the ongoing problem of expired carbonated soft drink (CSD) cans in the export stock of ABC beverage company. Although the company's targeted write-off threshold was 3%, the company has consistently exceeded this benchmark, which has resulted in operational and financial inefficiencies. The research explores the reasons for these high write-off rates and discusses how inventory management could be optimized to reduce such losses. Applying a qualitative approach and a thematic analysis to the data generated from literature and in-depth interviews with key operational, marketing and export staff, the study finds that inaccurate demand forecasting, outdated inventory management systems, inadequate staff training and poor cross-functional integration are contributing factors to the problem. Results reinforce the importance of advanced forecasting methods, real-time stock visibility and the use of lean inventory practices. Suggestions are given as to what the ABC beverage company could do to better control inventories, minimize waste in the environment, and improve export profitability. The study also adds to the practical and academic discussion on sustainable inventory practices in fast-moving consumer goods (FMCG) sectors which can be generalized for most of the companies in the said sector.

Keywords: *Demand forecasting, Expired CSD cans, Export operations, Inventory management, Lean inventory*

Resilience development process of Sri Lankan employees in response to polyadversity

R. Razik, P. Kailasapathy

*Department of Human Resource Management, Faculty of Management and Finance,
University of Colombo, Sri Lanka*

Resilience has gained traction among scholars and practitioners in the organisational domain in the recent past, as it facilitates organisations as well as individuals to overcome adversities. The process conceptualisation of resilience asserts that resilience is a product of resources utilised and mechanisms enacted by individuals in response to various adversities. This study aimed at exploring the resilience development process of the employees in business organisations in Sri Lanka, in response to the mandated working from home [MWFH] during the Covid-19 pandemic. MWFH is regarded as a polyadversity that initially emerged as an acute adversity, which later transformed to a chronic adversity, due to its prolonged nature. Currently available research on resilience development processes explores either the resilience process or mechanisms, thus fail to capture the interplay between resilience resources and mechanisms towards fostering resilience. This qualitative study which is part of a larger study on employee resilience, adopted an interpretivist research philosophy. Participants included 28 employees, who demonstrated high level of resilience in adapting to the polyadversity, identified through a survey conducted as part of a larger research project on workplace resilience. Data were analysed manually using Thematic Analysis. Communication Theory of Resilience and Integrative Resilience Model for Employees, were jointly used as the theoretical lenses of the study. The resources utilised by the participants included: personal resource (e.g., personality), work resources (e.g., revising organisational policies), family resources (e.g., support to vent emotions), social resource (e.g., sourcing of supplies), community resources (e.g., membership in new online communities) and energy resource (e.g., natural energies). Utilising these resources, participants revealed they enacted five mechanisms: crafting normalcy, affirming identity anchors, legitimizing negative feelings while foregrounding positive actions, putting alternative logics to work, and crafting and/or maintaining communication networks. The study identified resilience of employees in adapting to a polyadversity that they were forced into, without prior preparation. This research advances the current understandings on workplace resilience through many novel contributions. To our knowledge this is one of the very first studies that examines both resilience resources and mechanism in a single study, deploying a robust mechanism to identify participants who precisely demonstrated high level of resilience in ascertaining their resilience development process. Limitations and future research directions are provided.

Keywords: *Resilience development, Resilience resources, Resilience mechanisms*

The impact of Foreign Family Supportive Supervisor Behaviour on work-life balance: Moderating role of cultural intelligence

M. N. M. Najar, P. C. Gamage

*Department of International Business, Faculty of Management and Finance,
University of Colombo, Sri Lanka*

The COVID-19 pandemic heightened global concerns about work-life balance among employees due to unprecedented challenges in managing personal and professional responsibilities. In the South Asian region, Sri Lankan employees reported the highest levels of work-related stress. Family Supportive Supervisor Behaviour (FSSB) is positively related to work-life balance, as supportive supervisors enable employees to better manage their work and family roles through understanding, flexibility, and emotional support. Although there are numerous studies on FSSB on work-life balance, there is a dearth of research among the employees working under foreign supervisors and specifically in the Sri Lankan context. Due to increased globalization, several multinational companies are established in the country, and Sri Lankan employees are bound to work under foreign supervisors. Therefore, this study seeks to fulfil the gap in the existing literature by examining the relationship of Family Supportive Foreign Supervisor Behaviour on work-life balance and the moderating role of cultural intelligence. A structured online questionnaire was sent to 104 Sri Lankan employees, working under foreign supervisors as an inclusion criterion. Correlation analysis, Regression analysis and Moderator analysis were performed in this study to test the hypothesis derived from the Conservation of Resources Theory. The findings of the study confirmed a positive and significant relationship of Family Supportive Foreign Supervisor Behaviour on work-life balance, which aligns with the first hypothesis. However, the finding for the second hypothesis on the moderating role of cultural intelligence does not support this study. It highlights that although cultural intelligence is an important factor in a multicultural setting, it is not influential in every domain, such as the Sri Lankan context, where the impact of collectivism and high-power distance plays a major role in the workplace environment. This study contributes theoretically by highlighting the positive impact of Family Supportive Foreign Supervisor Behaviour on work-life balance, while explaining the moderation role of cultural intelligence as insignificant. Also, this study contributes managerially by suggesting that organizations in the Sri Lankan context promote hiring and developing foreign supervisors, because it directly benefits employee work-life balance.

Keywords: *Conservation of Resources Theory, Cultural intelligence, Family Supportive Foreign Supervisor Behaviour, Work-life balance*

The impact of internationalism on consumer ethnocentrism and purchase intentions: The moderating role of consumer personality among Sri Lankan consumers

L. Chethana, N. H. M. S. M. Herath

*Department of International Business, Faculty of Management and Finance,
University of Colombo, Sri Lanka*

As globalization continues to influence consumer behavior, understanding how openness to foreign cultures (internationalism) shapes domestic purchasing decisions is increasingly important for emerging markets such as Sri Lanka. Consumer ethnocentrism, which reflects the belief that purchasing local products supports the national economy and preserves cultural identity, may be influenced by both sociocultural factors and individual psychological characteristics. In order to explore this further, this study examined the impact of internationalism on consumer ethnocentrism and purchase intentions of local products in Sri Lanka, with particular focus on the moderating role of consumer personality traits. Data were collected from a sample of 230 Sri Lankan consumers using a structured questionnaire. The survey measured levels of internationalism, consumer ethnocentrism, purchase intentions, and the Big Five personality traits - extraversion, agreeableness, neuroticism, openness to experience, and conscientiousness. The collected data were analyzed using SPSS through descriptive statistics, correlation, reliability and validity testing, and multiple regression techniques, including mediation and moderation analyses. The results revealed significant relationships between internationalism, consumer ethnocentrism, and purchase intentions. Specifically, internationalism was found to negatively influence purchase intention for domestic products while showing a positive relationship with consumer ethnocentrism. Consumer ethnocentrism positively affected local purchase intentions, and the mediation analysis confirmed that consumer ethnocentrism partially mediates the link between internationalism and purchase intention. Furthermore, personality traits moderated these relationships, suggesting that consumers with different psychological personalities respond differently to international exposure and ethnic orientations. This study contributes to the literature by integrating Social Identity Theory and the Big Five Personality Traits Model to explain how consumers perceive the global impact of their decisions and how personality traits influence variations in domestic product purchasing behaviour. The results provide valuable insights for marketers and policymakers in Sri Lanka, highlighting the need for marketing strategies that consider both cultural attitudes and personality differences. Marketers can use these findings to create targeted campaigns that appeal to ethnocentric consumers while also meeting the needs of those more open to global influences, ultimately fostering the growth of local industries in a competitive global marketplace.

Keywords: *Internationalism, Consumer ethnocentrism, Consumer personality, Purchase Intention, Big Five Personality traits*

The impact of westernization on intention for green consumption among Gen Z consumers: The mediating role of status-driven consumption

M. A. S. Navoda, H. K. D. K. Fernando

*Department of International Business, Faculty of Management and Finance,
University of Colombo, Sri Lanka*

Westernization is the process by which individuals from non-western countries adopt aspects of western culture, ideas, technologies, and lifestyles. This study investigates the influence of Westernization on the intention for green consumption of generation Z consumers, with a particular focus on Sri Lanka. It examines how exposure to western ideals and lifestyles impacts young consumers' values and behaviours regarding green products. Central to the study is the role of status-driven consumption as a mediating factor in this relationship. The study aims to fill the gap in existing literature by analyzing the interconnected effects of westernization, status motives, and green purchase intention among non-western youth in light of social cognitive theory. The data were collected through an online self-administered questionnaire from 122 Gen Z consumers residing in the Colombo District, Sri Lanka. The responses were analyzed using correlation analysis to examine the associations among variables, and regression analysis (including mediation testing through the PROCESS macro in SPSS 22) to assess the direct and indirect effects between constructs. The findings highlight that western cultural influences significantly shape Gen Z's intention for green consumption and that the desire for status driven consumption further mediates this relationship, emphasizing the importance of status motivation in promoting sustainable consumption patterns among non-western young consumers. By addressing the limited attention given to the intersection of westernization, status motives, and green consumption in non-western contexts, this study extends current knowledge and provides a foundation for future research on sustainable consumer behaviour.

Keywords: *Westernization, Status-driven consumption, Green consumption, Gen Z, Social cognitive theory*

The impact of workplace diversity climate on perceived overqualification and career satisfaction: Moderating role of motivation of migrant employees

G. N. Wijesooriya, P. C. Gamage

*Department of International Business, Faculty of Management and Finance,
University of Colombo, Sri Lanka*

The growing emphasis on workplace diversity has prompted organizations to recognize the importance of fostering inclusive environments that shape employee experiences. However, existing literature highlights a lack of research on organizational antecedents and how diversity management practices influence the career satisfaction of migrants. Understanding the relationship between diversity climate and career outcomes is crucial since organizational practices such as recruitment, selection, performance management, and training can significantly impact migrants' careers. Furthermore, career outcomes of migrant employees are shaped by their individual characteristics such as determination, adaptability and career management techniques. This study investigates the impact of workplace diversity climate on perceived overqualification and career satisfaction among migrant employees with the moderating role of motivation. Drawing upon Person-Environment fit theory and Self-determination theory, this study adopts a positivist research philosophy with a quantitative approach. The Person-Environment fit theory explains how the mismatch of qualifications, diversified workplaces affect the career satisfaction of a migrant employee, while Self-Determination theory explains how crucial it is for an employee to be intrinsically motivated to achieve higher productivity, lower turnover and career satisfaction. The population of the study is Sri Lankan citizens currently employed abroad, mainly in foreign owned organizations across multiple countries and sectors. Data were collected from 110 respondents using a structured questionnaire. The study used purposive sampling and snowball sampling because migrant employees are geographically scattered and hard to access. Three hypotheses were derived to test the impact of diversity climate on the career satisfaction of migrant employees and to examine the mediating effect of perceived overqualification and the moderating effects of motivation. The research conducted quantitative analysis using SPSS, including correlation and regression analysis, mediation analysis via the Sobel test, and moderation analysis using interaction term regression. The findings revealed that the diversity climate significantly influences both perceived overqualification and career satisfaction, with motivation as a moderator. The workplace diversity climate positively influences career satisfaction, but this relationship is fully mediated by perceived overqualification indicating that migrant employee's feelings of being overqualified play a crucial role. Motivation acts as a significant moderator in the relationship between diversity climate and career satisfaction. The study theoretically contributes to the existing literature by identifying perceived overqualification and motivation as key psychological mechanisms that provide a nuanced understanding of how individual level factors interact to shape the career satisfaction of migrant employees, and offers practical recommendations for organizations aiming to create more inclusive, motivating work environments that foster employee satisfaction and retention. Moreover, it advances research on workplace diversity climate by examining its impact in the underexplored context of migrant employees, specifically Sri Lankans working in various parts of the world.

Keywords: *Diversity climate, Career satisfaction, Perceived overqualification, Motivation, Migrant employees*

FACULTY OF TECHNOLOGY



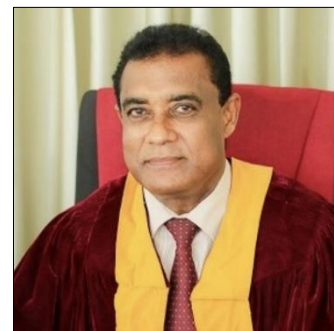
Innovative Resilient Technologies for a Sustainable Future

8th December 2025

MESSAGE FROM THE DEAN

Professor Ranjana U. K. Piyadasa

*Faculty of Technology
University of Colombo
Sri Lanka*



It gives me immense pleasure to welcome you to the Annual Research Symposium 2025 of the Faculty of Technology. This year, we gather under the theme “*Innovative Resilient Technologies for a Sustainable Future*” a call to action that reflects both urgency and opportunity in today’s rapidly changing world.

Resilience has become an essential quality for technology in the 21st century. In the face of climate change, resource scarcity, and rising social and economic vulnerabilities, innovation must extend beyond novelty to durability. Resilient technologies, whether in energy, food systems, infrastructure, or digital networks enable societies to adapt, recover, and thrive despite uncertainty. Early adoption of such solutions not only strengthens long-term sustainability but also reduces the risks and costs of inaction.

This symposium provides a vital platform for our researchers and students to present their cutting-edge work that bridges knowledge and practice. The diversity of research represented here demonstrates the faculty’s commitment to multidisciplinary, with contributions spanning from sustainable energy, smart agriculture, environmental monitoring, advanced materials, and digital technologies for resilience. Each project reflects the spirit of innovation that seeks not just to improve current systems but to build technologies capable of withstanding tomorrow’s challenges.

Our success rests on the dedication of our faculty members, students, and partners. Their collective efforts continue to strengthen the Faculty of Technology’s reputation as a hub of excellence where research leads to practical, scalable, and future-oriented solutions. As we reach on this year’s symposium, I encourage all participants to engage fully, by having insightful discussions, exchange ideas, and explore opportunities for collaboration. The challenges before us are complex, but by combining innovation with resilience, we can chart a path toward a sustainable and inclusive future.

Thank you for joining us for the Annual Research Symposium 2025. I look forward to the knowledge, creativity, and inspiration that will emerge from the discussions.

MESSAGE FROM THE SYMPOSIUM CHAIR

Professor Sansfica M. Young

*Department of Environmental Technology
Faculty of Technology
University of Colombo
Sri Lanka*



It is my pleasure to serve as the Symposium Chair of the Annual Research Symposium 2025 of the Faculty of Technology (ARS 2025 - FOT) which will be held on the 8th of December 2025 under the theme of “Innovative Resilient Technologies for a Sustainable Future”. The goal of the ARS 2025 - FOT is to bring together a diverse group of staff and students of the Faculty of Technology to share ideas and explore innovative work carried out by them which leads to technological advancement.

We are delighted to have Prof. Indika Karunathilake, the Vice-Chancellor of the University of Colombo as the chief guest and Prof. Jagath Manatunge, Dean, Faculty of Engineering, University of Moratuwa, Sri Lanka and Dr. Susanne Bodach, Research Group Leader - Integrated Circular Economy Transformation, International Water Management Institute (IWMI), Sri Lanka as the keynote speakers of the event.

I would like to greatly appreciate the continuous guidance and support of the Dean, Faculty of Technology, Prof. Ranjana U. K. Piyadasa, to make this event a success. I would also like to thank everyone involved in organizing the Annual Research Symposium 2025 of the Faculty of Technology, particularly the members of the organizing committee, the session chairs, and the numerous volunteers, without whose generous contributions, this symposium would not have set a new record for the number of presentations and participants. I hope that this conference will allow the participants a productive discourse not only in expanding their knowledge but also in sharing their research findings leading to technological advancements.

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SYMPOSIUM PROGRAMME

8.00 am – 8.30 am	Registration of Participants
8.30 am – 8.35 am	National Anthem
8.35 am – 8.45 am	Lighting of the Traditional Oil Lamp
8.45 am – 8.55 am	Welcome Address <i>Prof. Ranjana U. K. Piyadasa</i> <i>Dean, Faculty of Technology, University of Colombo</i>
8.55 am – 9.05 am	Short Video Clip on Research Activities of the Faculty of Technology
9.05 am – 9.15 am	Address by the Chief Guest <i>Prof. Indika Karunathilake</i> <i>Vice-Chancellor, University of Colombo</i>
9.15 am – 10.30 am	Tea Break/Undergraduate Research and Innovation Showcase
10.30 am – 11.00 am	Keynote Address I: “Engineering Resilience: Harnessing Innovation for a Sustainable Future” <i>Prof. Jagath Manatunage</i> <i>Dean, Faculty of Engineering, University of Moratuwa</i>
11.00 am – 11.30 am	Keynote Address II: “Digital Innovation for Circular Agri-Food Systems” <i>Dr. Susanne Bodach</i> <i>Group Leader - Integrated Circular Economy Transformation</i> <i>International Water Management Institute (IWMI), Sri Lanka</i>
11.30 am – 11.40 pm	Vote of Thanks <i>Prof. Sansfica M. Young</i> <i>Symposium Chair, ARS 2025 - FOT</i>
11.40 am – 1.00 pm	Lunch Break
1.00 pm – 3.15 pm	Parallel Technical Sessions
3.15 pm – 3.30 pm	Tea Break
3.30 pm – 4.55 pm	Parallel Technical Sessions
4.55 pm – 5.00 pm	Concluding Remarks

INTRODUCTION TO THE KEYNOTE SPEAKER – I

Dr. Susanne Bodach

*Research Group Leader
Integrated Circular Economy Transformation
International Water Management Institute (IWMI)
Sri Lanka*



Dr. Susanne Bodach is the Research Group Leader for Integrated Circular Economy Transformation at the International Water Management Institute (IWMI), part of the CGIAR global research partnership. With two decades of experience across research, international development, and the private sector, she works at the intersection of circular economy, sustainable energy, climate change, and resource recovery. Her research focuses on innovative models for closing water and nutrient loops, advancing safe wastewater reuse, and fostering inclusive circular value chains.

Dr. Bodach has a strong interdisciplinary background, holding a PhD from the Technical University of Munich and an MSc from Cologne University of Applied Sciences. She has advised leading international organizations including UNDP, ADB, the World Bank, AIIB, GGGI, and GIZ. Her current research interests extend to the role of digital innovation in circular economy transitions, including the use of AI-powered tools, decision-support systems, and digital twins to strengthen circular business models and resilience in agri-food systems. She is also engaged in the science of innovation scaling, emphasizing inclusive and responsible approaches that empower women, youth, and marginalized groups.

ABSTRACT OF THE KEYNOTE ADDRESS – I

Digital Innovation for Circular Agri-Food Systems

Dr. Susanne Bodach

International Water Management Institute (IWMI), Sri Lanka

Circular economy approaches in agri-food systems create opportunities to regenerate resources, reduce emissions, and enhance resilience. Yet the interconnected flows of water, waste, and soil demand integrated solutions that extend beyond sectoral silos. Recent literature highlights how digital innovation, including sensing, modelling, decision-support systems, and inclusive data platforms can accelerate transitions from linear to circular systems by making complexity more tractable and enabling informed, multi-objective choices.

This keynote explores how digital tools are reshaping circular practices in agri-food systems, drawing on case studies from water-scarce and resource-constrained regions. Examples include the application of artificial intelligence to detect wastewater treatment facilities and identify opportunities for safe water reuse, multi-criteria decision-support tools that evaluate waste-to-value options in agriculture, and AI-powered chatbots that support training, dissemination of circular business models, and stakeholder engagement. Together, these approaches illustrate how digital innovation can help to “close loops” in the water–waste–soil nexus, while supporting inclusivity, knowledge exchange, and scaling of solutions.

By linking perspectives from environmental, agricultural, automation, and ICT domains, this work demonstrates how digital and circular pathways can reinforce each other in practice. Digital twins, AI-driven analytics, and participatory platforms open new possibilities for aligning sustainability goals with local priorities, thereby guiding the next generation of circular innovations for resilient agri-food systems.

INTRODUCTION TO THE KEYNOTE SPEAKER – II

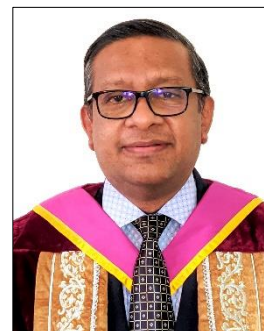
Professor Jagath Manatunage

Dean

Faculty of Engineering

University of Moratuwa

Sri Lanka



Professor Jagath Manatunge is a Professor in Environmental Engineering and the current Dean of the Faculty of Engineering at the University of Moratuwa, Sri Lanka. A First-Class Honours graduate in Civil Engineering with a perfect GPA of 4.0/4.0, he earned his Masters degree (MSc and DIC) in Environmental Technology from Imperial College London on the prestigious Chevening Scholarship, and completed his Ph.D. in Environmental and Biological Sciences at Saitama University, Japan, under a Monbukagakusho Scholarship. He later continued his postdoctoral research as a JSPS Fellow in Japan.

In addition to his academic and research credentials, Professor Manatunge is a Chartered Engineer and a Passed Finalist of the Chartered Institute of Management Accountants (CIMA). He is a Fellow of the National Academy of Sciences of Sri Lanka. He is also a member of several esteemed professional bodies, including the Institution of Engineers Sri Lanka, the Institute of Environmental Professionals in Sri Lanka, the Japan Society of Limnology, the Japan Society for the Water Environment, the Asia Oceania Geosciences Society, and the Asia Pacific Association of Hydrology and Water Resources.

His international academic engagements include appointments as Assistant Professor at Saitama University, and teaching fellowships at the University of Tokyo, Hosei University (Tokyo), the University of Newcastle (Australia), and Padjadjaran University (Indonesia). Notable areas of his expertise include lake and lagoon restoration, constructed wetlands, algal bloom control, ecohydrological modeling, and technology diffusion in irrigation and water management systems. His contributions to environmental assessments and strategic planning have also supported major national and regional development initiatives. Professor Manatunge has also served as a consultant to several international organizations including the Asian Development Bank, World Bank, and Agence Française de Développement, and has provided expert guidance on environmental safeguards, resettlement, and feasibility studies across Asia.

Beyond academia, he continues to shape national environmental policy and mentor the next generation of engineers and environmental scientists. He currently serves as the Chairman of the Advisory Committee for the China–Sri Lanka Joint Research Centre under the Ministry of Water Supply, and as an Advisor on Environmental Policy Research at the Center for East Asian Development Studies in Tokyo, Japan.

ABSTRACT OF THE KEYNOTE ADDRESS – II

Engineering Resilience: Harnessing Innovation for a Sustainable Future

Professor Jagath Manatunage

*Department of Civil Engineering, Faculty of Engineering
University of Moratuwa, Sri Lanka*

Resilience has emerged as one of the most critical imperatives of our time. From the accelerating impacts of climate change to global supply chain disruptions and technological upheavals, societies worldwide are being tested in unprecedented ways. In such a context, resilience is no longer about merely “bouncing back” from adversity; it is about “bouncing forward”, namely, learning, adapting, and building stronger systems that thrive in the face of uncertainty.

This keynote will explore how innovative technologies can serve as powerful enablers of resilience and sustainability. It will highlight three key dimensions. First, digital resilience, where advances in artificial intelligence, big data analytics, and digital twin modeling provide the ability to anticipate risks, test alternative futures, and design adaptive responses. Second, environmental resilience, where hybrid approaches that blend engineering innovation with nature-based solutions help restore ecosystems, secure water, and mitigate climate impacts. Third, social and community resilience, where inclusive technologies such as affordable IoT sensors, renewable microgrids, and participatory platforms empower citizens and institutions to act collectively in times of stress.

Drawing on regional experiences in Sri Lanka and South Asia, as well as global best practices, the keynote will showcase practical examples of resilience in action: from real-time water quality monitoring and climate-smart agriculture to decentralized energy systems and resilient infrastructure design. These cases illustrate how technology, when integrated thoughtfully with governance and community engagement, can provide scalable and transformative solutions.

Finally, the talk will emphasize the pivotal role of universities, researchers, and young innovators in shaping this agenda. By fostering interdisciplinary collaboration, ethical responsibility, and bold experimentation, academia can lead the transition towards a sustainable and resilient future. This address will invite participants to envision resilience not as a defensive shield but as an engine of innovation, sustainability, and hope for generations to come.

LIST OF ABSTRACTS

Morpho–physiological characterization of tomato (<i>Solanum lycopersicum</i> L.) F1 hybrids and their parents for heat tolerance	
<i>W. J. A. P. M. Jayasooriya, U. M. A. Kumara, H. Fonseka, G. K. M. M. K. Ranaweera</i>	336
Development of a temporary immersion bioreactor prototype for regeneration and multiplication of banana (<i>Musa</i> spp.)	
<i>G. A. D. P. Gunathilaka, N. V. T. Jayaprada, P. Samanthilaka</i>	337
Development of a callus regeneration protocol for “Masan” (<i>Ziziphus mauritiana</i>) using shoot tip culture	
<i>H. H. A. Shakthi, N. V. T. Jayaprada, P. Samanthilaka</i>	338
Molecular identification and selected nutritional and bio-active properties of Swayanjatha: a traditional food grain in Sri Lanka	
<i>J. V. K. A. Sajeewani, H. H. K. Achala, W. K. S. M. Abeysekera, U. M. A. Kumara, D. C. M. S. I. Wijewardana</i>	339
Formulation and nutritional evaluation of a mung bean incorporated cheese spread	
<i>L. A. D. Kumararathna, H. K. P. P. Kariyawasam, D. M. E. Senevirathna</i>	340
Development and quality evaluation of spice incorporated processed cheese	
<i>W. M. N. Navodya, G. W. S. Lakmini, R. M. S. Gunathilaka</i>	341
Genetic diversity of bacterial communities associated with bacterial leaf blight of rice in Sri Lanka	
<i>A. Kirubashini, U. M. A. Kumara, C. Ranasinghe</i>	342
Sugarcane yield prediction using UAV-derived vegetation indices and machine learning models	
<i>M. C. Rasangika, U. W. L. M. Kumarasiri, T. Ariyawansha</i>	343
Development of sugarcane trash-based guava covering	
<i>E. P. W. Madhuwanthi, U. I. P. Perera, T. Ariyawansha</i>	344
Predicting plant height, tiller number, and stem girth in sugarcane from UAV-derived vegetation indices via linear regression	
<i>W. A. H. S. Ewanthi, U. W. L. M. Kumarasiri, T. Ariyawansha</i>	345
Optimizing sodium alginate application rate for the production of fertilizer-coated capsicum (<i>Capsicum annum</i> L.) seeds to enhance germination, growth, and yield	
<i>C. J. Pathirana, N. R. N. Silva, J. J. Wewalwela</i>	346
Comparative analysis of atmospheric microplastics in urban centers of Sri Lanka: insights from Colombo, Kandy, and Kurunegala	
<i>H. A. I. A. Hettiarachchi, S. M. Young, L. Jayarathna</i>	347

Exploring feasibility of cultivating edible mushroom using cotton textile waste: A sustainable approach	
<i>N. N. Doray, I. S. Hewage, K. G. N. H. Weerasinghe, S. M. Young, R. U. Halwatura</i>	348
Seasonal dynamics of leachate pollution potential at Kerawalapitiya Waste Park in Muthurajawela wetland, Sri Lanka; a Leachate Pollution Index study	
<i>S. J. S. Bandara, R. U. K. Piyadasa, S. Himanujahn, E. R. Gunawardhana</i>	349
Assessing the applicability of global loss and damage frameworks in national and local policies to address climate-induced loss and damage in Sri Lanka	
<i>E. M. K. S. Ekanayake, W. G. K. Withana, R. U. K. Piyadasa</i>	350
Bioplastic production from Guinea grass (<i>Megathyrsus maximus</i>)	
<i>B. D. A. Navodha, K. A. Sirisena</i>	351
Comparative analysis of ancient and modern clay bricks: Insights from compressive strength and microstructural characterization	
<i>K. D. H. J. Premarathne, R. U. Halwatura, S. M. Young, T. Mendis, R. M. Padmaja</i>	352
Sequencing batch reactor for a sewage water treatment plant for the removal of nutrients	
<i>H. M. N. Priyashantha, K. A. Serisena, U. G. N. P. Darshani, S. A. T. D. Sakalasuriya, C. Hewawasam</i>	353
Geotechnical and environmental evaluation of tunnel muck as a sustainable road filling material	
<i>S. Suvaki, M. I. Sudasinghe, J. L. D. T. Wijegunasekara</i>	354
Innovative approaches in agricultural technology for early drought detection using Earth Observation data	
<i>M. Bandara, R. U. K. Piyadasa</i>	355
Valorization of food processing sludge through biochar production and application as a soil amendment in sustainable agriculture	
<i>S. M. Bandusena, J. J. Wewalwela, T. N. Dharmapriya</i>	356
Evaluation of secondary biomass feedstocks for densified bio-pellet production	
<i>S. Dharshani, S. Sayanthan, R. G. R. N. K. Ariyaratne</i>	357
Environmental assessment of plasticizer contamination in leachate sediments from open dumpsites in Sri Lanka	
<i>W. H. D. Shehara, C. Manangodage, T. N. Dharmapriya, A. U. Rajapaksha, S. Ramanayaka, M. Vithanage</i>	358
Investigation of bamboo-derived adsorbents for water treatment: Challenges in water hardness removal caused by calcium and magnesium ions	
<i>I. S. Wickremasinghe, R. M. M. K. Karunathilaka, T. N. Dharmapriya, N. Priyantha</i>	359
Bioelectrical signal responses of <i>Mimosa pudica</i> L. (Nidikummba) to instant light–dark transitions	
<i>L. D. G. Jayathilake, I. B. Abeywickrama, V. A. P. Senevirathna, B. L. S. Thilakarathne</i>	360

Design and experimental testing of a load cell-integrated active suspension system for terrain-adaptive mobile robots <i>Y. H. I. K. Sadeepana, W. C. N. H. B. Wijerathna, G. C. C. Rukshan, K. D. R. N. Kalubowila</i>	361
Design and development of a modular 5-axis CNC milling machine for small and medium enterprises (SMEs) <i>K. M. G. S. U. Kariyawasam, A. G. M. Bandara, M. S. I. Hussain, U. V. H. Sameera</i>	362
Machine learning based defect detection system for boundary laminated fabric accessories <i>W. K. S. Viduranga, H. Y. R. Atapattu, P. L. C. S. Silva</i>	363
3D printed gyroid lattice structures from recycled PET (rPET) for electric vehicle battery crash protection <i>K. W. S. N. Wijesundara, C. D. S. Kelum, E. M. J. C. Ranasinghe, K. D. R. N. Kalubowila, K. M. G. S. U. Kariyawasam</i>	364
Development of a device to detect <i>in vitro</i> derived glycated proteins based on the fluorescence quenching properties of graphene oxide <i>N. A. Malagala, B. P. N. Kumara, W. P. P. Kaweesha, H. Y. R. Atapattu, W. K. S. M. Abeysekera, N. Abeyasinghe, J. K. D. S. Jayanetti</i>	365
Design and development of an energy harvesting unit: A smart energy harvesting unit for highways in Sri Lanka <i>S. N. N. W. W. G. R. T. Abesiri, M. M. T. D. K. Madurusingha, N. M. V. Weerasingha, U. V. H. Sameera, P. A. G. M. Amarasinghe</i>	366
Design and development of a PLC-based semi-automated <i>Kottu Roti</i> preparation machine <i>R. D. S. S. Kulasinghe, J. A. G. D. S. D. Nanayakkara, M. M. S. S. Mannapperuma, B. L. S. Thilakarathne</i>	367
Simulation-based approach to strength evaluation and material optimization in polytunnel structures for protected agriculture <i>J. A. T. Sandupama, U. Rathnathunga, N. A. R. Perera, B. L. S. Thilakarathne</i>	368
Development of an AI-driven semi-automated air rifle system for wild elephant conservation <i>K. M. G. S. U. Kariyawasam, S. M. M. Hashini, E. R. P. U. Jayarathne, H. M. P. B. Rathnayaka</i>	369
Development of a mobile seed-sowing robot for precision agriculture <i>K. D. Lakshan, P. A. L. Randima, D. M. L. Dhananjaya, U. S. Mutugala</i>	370
Nanostructured CuO/Cu₂O shish-kebab electrode preparation for metal oxide supercapacitor applications <i>G. N. Gamage, K. A. H. A. Dilshan, K. A. D. Shehan, G. G. C. Rukshan, J. K. D. S. Jayanetti, K. D. R. N. Kalubowila</i>	371

Punchi Panchi: gamified platform for kindergarten using affordances in constructivist teaching-learning with mood recognition	
<i>W. S. Kaushalya, A. S. M. Rathnasiri, W. M. S. Nethmika, J. M. C. M. Bandara</i>	372
CogniX: Constructive learning with an AI-based web App for open-ended question support	
<i>K. N. S. Dissanayake, S. A. E. P. Perera, B. P. Thewahettige, J. M. C. M. Bandara</i>	373
AI-powered home workout assistant: Real-time pose estimation and repetition counting for exercises	
<i>P. T. G. S. S. Premachandra, H. M. S. D. Yapa, S. T. T. Samarasinghe, C. K. Samarasekara ..</i>	374
Athuru Mithuru: A comprehensive digital platform for predicting learning disorders in children	
<i>G. B. C. Jayalath, N. G. D. V. Nirmani, L. I. Kariyawasam, J. M. C. M. Bandara</i>	375
Cinnamon Care: A novel deep learning enabled cinnamon diseases identification platform	
<i>U. A. S. Tharaka, H. M. J. Wathsala, N. N. Thilakarathne</i>	376
Enhanced salary prediction in data science industry: Integrating economic indicators with XGBoost regression	
<i>W. G. J. S. Wimalasena, A. G. L. Lakshitha, C. K. Samarasekara</i>	377
Cloud Era: An AI-driven multilingual chatbot for intelligent multi-cloud resource guidance	
<i>P. M. Kandamby, V. P. Wattegedara, N. N. Thilakarathne</i>	378
Tea Guardian: A novel hybrid deep learning-driven approach for tea leaf disease detection and treatment recommendation	
<i>P. D. U. I. Pushpakumara, B. A. U. L. Bamunusinha, W. D. G. M. Wijesinha, N. N. Thilakarathne</i>	379
TagCly - predictive pet health management system using smart collar	
<i>K. Mirojan, S. Tharshan, S. Krishan, D. M. D. Dissanayaka, N. T. Weerawarna</i>	380
AgroStock: A location-based decision AI predictive platform for agricultural trade and inventory optimization in Sri Lanka	
<i>A. M. K. C. Wijebandara, S. L. Vithana, A. K. K. A. Hemachandra, N. T. Weerawarna</i>	381

Morpho–physiological characterization of tomato (*Solanum lycopersicum* L.) F1 hybrids and their parents for heat tolerance

W. J. A. P. M. Jayasooriya¹, U. M. A. Kumara¹, H. Fonseka², G. K. M. M. K. Ranaweera²

¹*Department of Agricultural Technology, Faculty of Technology, University of Colombo, Sri Lanka*

²*Onesh Agri (Pvt) Ltd, 100, Kent Road, Colombo 09, Sri Lanka*

Tomato (*Solanum lycopersicum*) is a cash crop for farmers globally and a significant source of nutrition for consumers, making them an essential part of the human diet. Tomato production is currently affected by several abiotic factors such as high temperatures due to global climate change. The most viable option to adapt climate change is to breed varieties resilient to future climate change. Therefore, this study was planned to assess the heat tolerance of eight tomato F1 hybrids and their parents (six) with commercial checks (Platinum F1 and KC-1) under local conditions. Under poly tunnel and open field conditions tomato entries were exposed to high temperature regimes at 28 - 40°C and 27 - 35°C respectively. Under experiment 01 Platinum F1 recorded the highest yield per plant (1454.6 ± 35.0 g) and there was no significant difference ($p > 0.05$) with TOH 22 (840.5 ± 196.2 g), TOH 18 (1106.1 ± 90.8 g) and TOH 21 (1143.0 ± 131.9 g). However, KC-1 recorded 516.0 ± 123.6 g/plant. The highest total number of fruits was recorded by TOH 21 (38.3 ± 4.6) while TOH 18 (84.9 ± 3.0 g) showed the highest single fruit weight. According to the pollen viability and relative water content TOH 18, TOH 21, TOH 22 and TOH 20 seemed to have heat-tolerant characters. Overall F1 hybrids of TOH 18, TOH 21, TOH 22, and TOH 20 showed the best performance under both environments. Thus, these results would be useful for breeders to identify and develop new heat tolerance varieties for local conditions.

Keywords: *F1 hybrids, Heat tolerance, Tomato, Local conditions*

Development of a temporary immersion bioreactor prototype for regeneration and multiplication of banana (*Musa* spp.)

G. A. D. P. Gunathilaka¹, N. V. T. Jayaprada¹, P. Samanthilaka²

¹*Department of Agricultural Technology, Faculty of Technology, University of Colombo, Sri Lanka*

²*Plant Tissue Culture Section, Greengrow Agriculture (Pvt) Ltd, Padukka, Sri Lanka*

Banana (*Musa* spp.) is an economically important fruit crop traditionally propagated in Sri Lanka through conventional tissue culture, which is labour-intensive, costly, and prone to contamination. Temporary Immersion Bioreactor (TIB) systems offer a more efficient alternative by automating the culture process through periodic immersion of plant tissues in nutrient media under sterile conditions. These systems use air pressure to transfer media between containers, reducing manual handling and simplifying plant tissue propagation. This study aimed to develop a cost-effective autonomous TIB prototype and evaluate its performance by comparing multiplication and contamination rates with the conventional tissue culture system. The system was tested using seedling explants of banana variety “Ambun” under controlled laboratory conditions. The TIB was developed using 1.5 L glass bottles and electro-pneumatic components, with timer-controlled valves programmed to open every 3 hours for 10 minutes, enabling sterile, automated immersion and nutrient exchange cycles. Sub-culturing in the TIB involved transferring explants into the reactor and regulating nutrient flow (MS medium) using timers. Banana explants from the fifth subculture were adapted in the two culture systems in a completely randomized design, and growth and contamination parameters were statistically compared using independent sample t-test. Results showed that the TIB system outperformed conventional methods. The average number of shoots in the TIB system was significantly higher (48.33 ± 1.453 ; $p=0.007$), compared to the conventional system (32.67 ± 2.728). Contamination was absent in the TIB system compared to the conventional method ($8.84 \pm 0.38\%$; $p=0.002$). Other growth parameters, such as average seedling canopy width (0.67 ± 0.067 cm; $p=0.039$), average root length (4.70 ± 0.041 cm; $p=0.009$), and the average number of leaves (45.67 ± 1.764 ; $p=0.021$), also demonstrated greater performances by TIB. These findings confirm that the TIB system is more effective than conventional tissue culture for banana propagation under the tested conditions.

Keywords: *Banana explants, Tissue contamination, TIB system, Tissue culture*

Development of a callus regeneration protocol for “Masan” (*Ziziphus mauritiana*) using shoot tip culture

H. H. A. Shakthi¹, N. V. T. Jayaprada¹, P. Samanthilaka²

¹Department of Agricultural Technology, Faculty of Technology, University of Colombo, Sri Lanka

²Plant Tissue Culture Section, Greengrow Agriculture (Pvt) Ltd, Padukka, Sri Lanka

Plant tissue culture is a widely used technique for the commercial-scale production of uniform, disease-free, and high-quality plants under controlled laboratory conditions. Lack of an efficient regeneration protocol for *Ziziphus mauritiana* “Local Masan”, limits commercial cultivation in Sri Lanka’s dry zones despite its adaptability and economic value. This study aimed to develop a tissue culture protocol by optimizing sterilization conditions and cytokinin concentrations using shoot tip explants, to enable the large-scale propagation of “Local Masan”. The study was carried out in a completely randomized design (CRD), with ten replicates per treatment using Murashige and Skoog (MS) culture medium. Four 6-benzylaminopurine (BAP) levels (1.5 mg/L, 1.0 mg/L, 0.5 mg/L, and 0 mg/L) and two sterilization protocols (S1, S2) were tested. Protocol S1 consisted of 15% Clorox, 0.1% mercuric chloride and 70% alcohol. Protocol S2 had 8% Sodium hypochlorite, 0.1% mercuric chloride and 70% alcohol. Tested parameters included viability, contamination, callus number, callus width, and callus length. Protocol S1 resulted in a higher percentage of viable, green explants ($90\% \pm 1.14$; $p=0.0788$) and significantly lower contamination rates ($45\% \pm 3.37$; $p=0.0461$) compared to S2. Among the cytokinin treatments, 1.5 mg/L BAP induced the highest number of callus regeneration (1.8 ± 0.13 ; $p=0.0006$) followed by 1.0 mg/L (1.5 ± 0.22). In terms of callus morphology, the 1.5 mg/L BAP treatment resulted in the highest callus width ($4.78 \text{ mm} \pm 0.62$; $p=0.008$) and the highest callus length ($3.47 \text{ mm} \pm 0.55$; $p=0.0107$), significantly outperforming the lower cytokinin concentrations. The results indicate that higher cytokinin concentration of 1.5 mg/L boosts morphogenic responses consistently yielding the most robust callus regeneration in *Z. mauritiana* ‘Local Masan’. These findings highlight the importance of optimizing hormonal levels and sterilization conditions in improving *in vitro* culture success for *Z. mauritiana*.

Keywords: Cytokinin, Callus, Tissue culture, Sterilization, *Ziziphus mauritiana*

Molecular identification and selected nutritional and bio-active properties of Swayanjatha: a traditional food grain in Sri Lanka

J. V. K. A. Sajeewani¹, H. H. K. Achala², W. K. S. M. Abeysekera¹, U. M. A. Kumara¹,
D. C. M. S. I. Wijewardana³

¹*Department of Agricultural Technology, Faculty of Technology, University of Colombo, Sri Lanka*

²*Industrial Technology Institute, Colombo, Sri Lanka*

³*Field Crop Research and Development Institute, Department of Agriculture,
Mahailuppallama, Sri Lanka*

Swayanjatha is a traditional grain indigenous to Sri Lanka. To date, its molecular identification, nutritional and bio-active properties have been largely unexplored. The present study aimed to perform molecular analysis and evaluation of selected nutritional and bio-active properties of Swayanjatha. The molecular analysis was performed using the conventional Polymerase Chain Reaction (PCR) method. Nutritional properties of whole grains (n = 3) of Swayanjatha were performed to determine moisture, crude protein, crude fat, crude ash, crude fiber, and total carbohydrate content. Antioxidant potential was assessed through total phenolic content (TPC) and DPPH (2,2-diphenyl-1-picrylhydrazyl) radical scavenging activity, while anti-inflammatory properties were evaluated via nitric oxide and superoxide radical scavenging activities using 70% ethanolic extracts for whole grains using high-throughput screening methodologies (n = 3 each). PCR analysis revealed the absence of the rice endosperm-specific prolamin gene, indicating that Swayanjatha might not belong to the genus *Oryza*. The mean moisture, crude protein, crude fat, crude ash, crude fiber and total carbohydrate contents were 10.95 ± 0.24 , 12.66 ± 0.09 , 3.6 ± 0.10 , 1.74 ± 0.00 , 1.60 ± 0.12 and $80.44 \pm 0.68\%$ respectively. The TPC was 20.60 ± 0.48 mg gallic acid equivalents (GAE)/g of extract. DPPH radical scavenging activity demonstrated a dose-dependent response with an IC₅₀ value of 129.72 ± 0.68 µg/mL [19.88 ± 0.47 mg Trolox equivalents (TEs)/g of extract]. Nitric oxide scavenging activity at concentrations of 0.25, 0.5, and 1.0 mg/mL was 38.72 ± 0.02 , 40.80 ± 0.23 , and $50.15 \pm 0.31\%$ respectively. Superoxide radical scavenging activity was $9.07 \pm 0.82\%$ at 2 mg/mL and $56.15 \pm 0.87\%$ at 4 mg/mL. It is concluded that further molecular analyses are warranted to elucidate its phylogenetic classification and Swayanjatha possesses desirable nutritional attributes along with notable antioxidant and anti-inflammatory properties.

Keywords: *Swayanjatha, Traditional food grain, Molecular identification, Nutritional properties, Bio-active properties*

Formulation and nutritional evaluation of a mung bean incorporated cheese spread

L. A. D. Kumararathna, H. K. P. P. Kariyawasam, D. M. E. Senevirathna

Department of Agricultural Technology, Faculty of Technology, University of Colombo, Sri Lanka

The demand for product diversification in the food industry has increased due to evolving dietary patterns and growing interest in plant-based foods. Traditional spreads are often high in fat and low in protein and dietary fiber, which raises nutritional and health concerns. In response, there is a growing need to develop alternative spreads that align with healthier eating habits. This study aimed to formulate and evaluate a nutrient-rich cheese spread by incorporating mung beans. The cheese was prepared using a standard cheese-making method with locally sourced, fresh milk. The milk fat was separately prepared and used as a homogenizing and thinning agent. Raw, roasted, and double-roasted mung bean powder were evaluated for their suitability in various formulations. The double-roasted mung bean powder (initial roasting of beans at 160°C for 10 min; powder roasting at 50°C for 8 min) was selected through preliminary testing. Bee honey and white pepper were tested as flavoring agents. Six different formulations were subjected to a standard sensory evaluation for the attributes of colour, flavour, taste, mouthfeel, spreadability and overall acceptability. The formulation containing 16% double-roasted mung bean and honey flavor was selected based on the overall acceptability score of 4.4/5. The selected formulation was subjected to physicochemical and proximate analyses and shelf stability test. Physicochemical properties included a pH of 5.53 ± 0.11 , moisture content of $21.4 \pm 0.34\%$ (wb), and water activity of 0.93 ± 0.005 . The proximate composition of the selected double-roasted mung bean powder incorporated cheese spread is: 405.04 ± 0.06 kcal/100 g of energy, 27.39 ± 0.43 g/100 g protein, 22.11 ± 0.26 g/100 g fat, and 2.98 ± 0.03 g/100 g fiber. The shelf life was reported as 18 days at refrigerated storage of 5°C with no added preservatives of any form. The formulated double-roasted mung bean incorporated cheese spread offers a nutritious alternative to traditional dairy-based spreads.

Keywords: *Cheese spread, Dairy product, Mung bean*

Development and quality evaluation of spice incorporated processed cheese

W. M. N. Navodya¹, G. W. S. Lakmini¹, R. M. S. Gunathilaka²

¹*Department of Agricultural Technology, Faculty of Technology, University of Colombo, Sri Lanka*

²*Department of Research and Development, Pelwatta Dairy Industries (Pvt.) Ltd., Pelwatta, Sri Lanka*

Processed cheese is a versatile dairy product popular for its convenience and unique flavor profile. Incorporating spices into processed cheese offers an opportunity to enhance sensory and nutritional attributes while meeting consumer demand for innovative spiced products. This study aimed to develop and evaluate spice-incorporated processed cheese, focusing on sensory attributes, proximate composition, physicochemical properties, and physical characteristics to enhance its flavor and nutritional profile. Preliminary trials were conducted to choose the best spice combination for the processed cheese. Accordingly, two spices were selected (black pepper, hot pepper) and blended in each with three concentrations: black pepper 0.33%, 0.67%, 1% and hot pepper 0.16%, 0.33%, 0.5% (W/W %) to select the best concentration and the best spice to incorporate. Processed cheese was prepared following the standard protocol with added major and minor ingredients: natural cheese, emulsifiers, food preservatives. The samples were evaluated for appearance, color, odor, taste, mouth feeling, spice taste, aftertaste, texture, nature and overall acceptability using 30 semi-trained panelists utilizing a seven-point hedonic scale. The most accepted sample: hot pepper incorporated 0.5% was further evaluated for analytical tests, including proximate, physicochemical, microbiological and sensory evaluation over a 4-week storage period under refrigerated conditions. Proximate analysis of the final product revealed that the product contained 30% of fat, 42.72% of protein, 42.68% of moisture, pH changed from 6.07 to 6.19 and titratable acidity from 0.20% to 0.15% over the storage period. Microbial tests confirmed the absence of *Escherichia coli* (0.00 cfu/g) and a negligible amount of coliform (1.66 cfu/g), yeast (13.33 cfu/g) and mold (1.66 cfu/g) growth. The quality assessments demonstrated that the product remained at a consumable level, indicating that the product can be stored at 4°C for up to 4 weeks. The study revealed that an innovative, nutritious processed cheese can be prepared by utilizing spices available in Sri Lanka.

Keywords: *Processed cheese, Hot pepper, Sensory evaluation, Proximate composition, Consumer acceptance*

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Genetic diversity of bacterial communities associated with bacterial leaf blight of rice in Sri Lanka

A. Kirubashini¹, U. M. A. Kumara¹, C. Ranasinghe²

¹Department of Agricultural Technology, Faculty of Technology, University of Colombo, Sri Lanka

²Rice Research and Development Institute, Department of Agriculture, Bathalagoda, Sri Lanka

Bacterial leaf blight, caused by the bacterium *Xanthomonas oryzae* pv *oryzae* (*Xoo*), is one of the main devastating diseases in rice. Due to the shifting genetic structure, associated microbial consortia and environmental conditions of *Xoo*, it is difficult to identify them according to their pathotype, for better management. This study aims to determine the genetic diversity of bacterial communities associated with bacterial leaf blight in rice through molecular perspectives. A total of 41 isolates were collected from different rice-growing areas belonging to wet zone, dry zone and intermediate upcountry zones in Sri Lanka. All the samples were cultured in yeast dextrose carbonate agar medium. Based on the morphological and geographical perspectives, six groups were selected. Polymerase Chain Reaction was performed with universal primers 27F and 1492R for selected groups. PCR restriction fragment length polymorphism with Hae III restriction enzyme and virulence analyses were performed to evaluate the genetic diversity of associated microbial communities in rice bacterial blight. Pathogenicity test was conducted for IRRI 61, IRRI 57, IRRI 03 (International Rice Research Institute) and TN1 (Taichung Native 1) rice lines. These results revealed significant differences in disease severity among the selected rice lines and their locations. Furthermore, results revealed significant genetic diversity among isolates. RFLP analysis revealed four distinct genetic clusters, indicating genetic diversity among six isolates. Based on the sequencing results, it was highlighted that, *Xanthomonas oryzae*, *Stenotrophomonas* sp., *Sphingomonas* sp and *Pantoea ananatis* were associated with bacterial leaf blight in rice cultivation in Sri Lanka. This finding would greatly help to develop new bacterial leaf blight resistance in rice for better disease management.

Keywords: Bacterial leaf blight, Restriction fragment length polymorphism, Rice, *Xanthomonas oryzae*

Sugarcane yield prediction using UAV-derived vegetation indices and machine learning models

M. C. Rasangika¹, U. W. L. M. Kumarasiri², T. Ariyawansha¹

¹*Department of Agricultural Technology, Faculty of Technology, University of Colombo, Sri Lanka*

²*Sugarcane Research Institute, Udawalawa, Sri Lanka*

Accurate yield prediction is crucial for resource planning and sustainable sugarcane production. Traditional methods are labor-intensive and spatially limited. This study explores the integration of UAV-derived multispectral imagery and machine learning models for predicting key yield attributes; field Brix and fresh weight of sugarcane variety SL 96 128. The research was conducted at the Sugarcane Research Institute, Udawalawa, Sri Lanka, using a nitrogen variability field trial. High-resolution images captured by a DJI Phantom 4 Multispectral UAV at 10, 11, and 12 months after planting were processed to compute five vegetation indices (NDVI, GRVI, ExG, DVI, and RVI). Ground data were collected from 180 Regions of Interest (ROIs), of which 70% (126 ROIs) were used for model training and 30% (54 ROIs) for validation. Simple linear regression and four ML models; Random Forest (RF), Support Vector Regression, Multiple Linear Regression, and Extreme Gradient Boosting (XGB) were evaluated. ML models outperformed statistical approaches, with RF and XGB achieving the highest accuracy for field Brix ($R^2 \geq 0.97$, $RMSE \leq 0.07$) and fresh weight ($R^2 = 0.99$, $RMSE < 1.3$). GRVI emerged as the most robust vegetation index, particularly at later maturity stages, due to its sensitivity to chlorophyll concentration and canopy greenness. The findings demonstrate that UAV-ML integration enables highly accurate, non-destructive yield prediction, supporting data-driven decisions for harvest scheduling and input management. This approach can significantly enhance precision agriculture practices in Sri Lanka and offers a scalable model for tropical sugarcane systems.

Keywords: *Machine learning, Random Forest, Sugarcane yield, UAV, Vegetation indices*

Acknowledgements: This work was supported by Sugarcane Research Institute, Sri Lanka.

Development of sugarcane trash-based guava covering

E. P. W. Madhuwanthi¹, U. I. P. Perera², T. Ariyawansha¹

¹*Department of Agricultural Technology, Faculty of Technology, University of Colombo, Sri Lanka*

²*Fruit Research and Development Institute, Horana, Sri Lanka*

Guava (*Psidium guajava*) is a nutritionally rich tropical fruit widely cultivated in Sri Lanka. However, its marketability is often limited by pest infestations, diseases, and abiotic stress such as sunburn. Fruit bagging is an effective eco-friendly technique for minimizing such damage, but the high cost and non-biodegradable nature of conventional coverings, such as plastic and wax-coated paper, necessitate the development of sustainable alternatives. This study investigated the feasibility of producing biodegradable guava coverings from sugarcane trash, an abundant agricultural residue, enhanced with natural additives. Sugarcane trash was pulped using the soda process with NaOH, and carboxymethyl cellulose was incorporated to improve sheet strength. Extracts of *Azadirachta indica* (Neem), *Aegle marmelos* (Bael), and *Limonia acidissima* (Lawalu) were tested for their water resistance and binding properties. Five paper formulations were produced and assessed for thickness, water absorption, and light transmission. Results indicated that treatment T2 (sugarcane trash with uncooked neem) achieved the lowest water absorption, while T2 and T3 (with cooked neem) provided moderate light transmission, beneficial for fruit development. Preliminary field application on guava fruits showed good wrapping performance and durability under outdoor conditions. Using 50 g of sugarcane trash, eight sheets of paper were produced with modest energy and water inputs, highlighting scalability for small-scale production. This study demonstrates the potential of sugarcane trash-based coverings as a cost-effective and eco-friendly alternative to synthetic fruit wrapping, contributing to waste valorization and promoting circular agriculture in Sri Lanka.

Keywords: *Fruit bagging, Guava covering, Natural additives, Sugarcane trash, Sustainable agriculture*

Predicting plant height, tiller number, and stem girth in sugarcane from UAV-derived vegetation indices via linear regression

W. A. H. S. Ewanthi¹, U. W. L. M. Kumarasiri², T. Ariyawansa¹

¹*Department of Agricultural Technology, Faculty of Technology, University of Colombo, Sri Lanka*

²*Sugarcane Research Institute, Udawalawa, Sri Lanka*

Efficient, scalable monitoring of sugarcane is constrained by labour-intensive field measurements. We developed and validated linear regression models using UAV multispectral imagery to predict plant height, tiller number, and stem girth. Model development was conducted at the Sugarcane Research Institute (SRI), Udawalawa, in a field trial of 64 plots comprising two varieties: SL 96 128 and CO 775 under eight nitrogen treatments. Multispectral data (DJI Phantom 4 Multispectral; Blue 450 nm, Green 560 nm, Red 650 nm, Red-edge 730 nm, NIR 840 nm) were collected at 10, 11, and 12 months after planting. Ground truth was recorded across 180 regions of interest (ROIs). We used a 75/25 split for model training/testing, yielding $n = 135$ for training and $n = 45$ for internal testing. Vegetation indices (NDVI, RVI, GRVI, ExG, DVI) were computed and regressed against agronomic traits. At 12 months, NDVI consistently outperformed other indices at SRI: plant height $R^2 = 0.76$ (RMSE = 5.92), tiller number $R^2 = 0.75$ (RMSE = 2.99), and stem girth $R^2 = 0.71$ (RMSE = 0.20). To assess generalizability, independent validation was performed on an unseen commercial dataset from the Lanka Sugar Company, Pelwatta. Validation retained strong performance for NDVI-based models: plant height $R^2 = 0.74$ (RMSE = 5.88), tiller number $R^2 = 0.73$ (RMSE = 2.78), and stem girth $R^2 = 0.70$ (RMSE = 0.15). Findings indicate that simple, interpretable linear models built on UAV-derived NDVI provide reliable predictions of sugarcane agronomic traits at maturity, with consistent accuracy across research and commercial settings. This workflow reduces dependence on manual sampling and enables timely, cost-effective decision-making for precision management.

Keywords: UAV, NDVI, Linear regression, Precision agriculture, Sri Lanka

Acknowledgements: This work was supported by Sugarcane Research Institute, Udawalawa, Sri Lanka.

Optimizing sodium alginate application rate for the production of fertilizer-coated capsicum (*Capsicum annum* L.) seeds to enhance germination, growth, and yield

C. J. Pathirana¹, N. R. N. Silva², J. J. Wewalwela¹

¹*Department of Agricultural Technology, Faculty of Technology, University of Colombo, Sri Lanka*

²*Horticultural Crops Research and Development Institute, Gannoruwa, Peradeniya, Sri Lanka*

Fertilizer-coated seeds exhibit enhanced seed germination efficiency, improved nutrient usage, and increased establishment of initial seedling vigor. Therefore, determining the optimal polymer application rate is a critical factor in the fertilizer coating process for capsicum (*Capsicum annum* L.), an economically significant cash crop. Biopolymers such as sodium alginate (NaAlg) can be used as the polymer matrix for coating process due to its biodegradability, hence no environmental impact. However, excess coating thickness can negatively affect the seed germination, and overall growth and development of the plant. Since the application rate has not been clearly established, such a study concerns itself with addressing the need to determine the optimal coating level for better seed performance and nutrient use efficiency. Thus, this study aimed to determine the optimal NaAlg concentration for seed coating to enhance the growth and yield of capsicum. It helps in influencing the release of the nutrients, and establishment of the plants. The experiment was carried out under controlled environmental conditions with six NaAlg-fertilizer coated seeds treatments (0.5%, 1%, 1.5%, 2%, 2.5%, 3%) and uncoated seeds as control with each having four replicates. Gannoruwa Prarthana hybrid capsicum variety was selected purposively and used as planting material. Urea (0.5 g) and MOP (0.325 g) were used to coat seeds according to the Agriculture Department fertilizer recommendation for capsicum. Plants associated with the seeds treated with a 1% NaAlg solution exhibited significantly enhanced growth and yield, achieving the highest mean values for plant height (53.09 cm), number of branches (20), pods (34), flowers (30), and yield per pot (1833.34 g) compared to other concentrations. Furthermore, the highest nutrient use efficiency also resulted with 1% NaAlg treatment. Thus, this study provides valuable insights into advancing fertilizer-coated seed technology and introduce a novel sustainable approach to maximize nutrient use efficiency in capsicum cultivation.

Keywords: *Biopolymer coating, Capsicum annum L., Fertilizer-coated seeds, Nutrient use efficiency, Sodium alginate*

Comparative analysis of atmospheric microplastics in urban centers of Sri Lanka: insights from Colombo, Kandy, and Kurunegala

H. A. I. A. Hettiarachchi¹, S. M. Young¹, L. Jayarathna²

¹*Department of Environmental Technology, Faculty of Technology, University of Colombo, Sri Lanka*

²*Department National Institute of Fundamental Studies, Kandy, Sri Lanka*

Atmospheric microplastics (AMPs) have emerged as a significant environmental pollutant with potential risks to human health and ecosystems. This study provides a comprehensive assessment of atmospheric microplastic pollution across three districts in Sri Lanka; Colombo, Kandy, and Kurunegala. These sites were selected due to their contrasting levels of urbanization, industrial activity, and population density, offering a representative cross-section of Sri Lanka's urban landscape. Microplastic particles were collected using passive air sampling from 15 locations (five sites per district) over three biweekly sampling rounds, covering residential areas, high-traffic zones, and industrial areas. The rigorous sample preparation, including pre-filtration and organic matter digestion was conducted to isolate microplastic particles for analysis. Optical microscopy and Raman spectroscopy were used for particle identification and characterization. Raman spectroscopy was preferred for its higher spatial resolution and ability to detect finer particles (<20 µm). The results showed average AMP counts of 5.8 ± 0.4 particles per sample in Kandy, 5.33 ± 0.47 particles per sample in Kurunegala, and 5.33 ± 0.29 particles per sample in Colombo, with higher counts observed in industrial zones and high-traffic areas. The selected industrial zones included Homagama, Getambe Junction, and Malkaduwwa, known for waste dumping, vehicular congestion, or nearby manufacturing activity. Fragments were the dominant type (61%), followed by fibers (18%), flakes (6%), and microbeads (1%). Spectral analysis identified polyethylene terephthalate (PET), polypropylene (PP), and polyethylene (PE) as the primary polymers. Meteorological parameters including temperature, wind speed, humidity, and rainfall showed no significant correlation with AMP counts ($P > 0.05$). This study highlights the urgent need for pollution control measures and targeted policies to manage microplastic pollution in Sri Lanka's urban environments, given the high prevalence of inhalable microplastic particles in these regions.

Keywords: *Atmospheric microplastics, Environmental policy, Health risks, Microplastic characterization, Urban pollution*

Exploring feasibility of cultivating edible mushroom using cotton textile waste: A sustainable approach

N. N. Doray¹, I. S. Hewage², K. G. N. H. Weerasinghe², S. M. Young¹, R. U. Halwatura²

¹*Department of Environmental Technology, Faculty of Technology, University of Colombo, Sri Lanka*

²*Department of Civil Engineering, Faculty of Engineering, University of Moratuwa, Sri Lanka*

All over the world, a large quantity of cotton textile waste is generated annually. The study was conducted to find a sustainable way to upcycle cotton textile waste while enhancing food production and supporting circular economy. *Pleurotus ostreatus* (oyster mushrooms) were grown by mixing black and white cotton textile wastes in the ratios of 25%, 50%, 75% and 100% with saw dust, and the control substrate was also tested for efficiency of producing mushroom harvest. The data of three flushes were recorded to assess the efficiency of each treatment and the study found that oyster mushroom can grow effectively on cotton waste with varying performances. The highest total quantity of yield and economic yield were obtained in 25% - 50% white cotton substrate. The nine treatments showed differences from each other ($p < 0.05$). The study also determined the concentrations of heavy metals Cu, Cr, Pb and Cd in the oyster mushrooms after dry acid digestion. The concentrations of heavy metals ranged from 0.08 – 0.20 mg/kg for Cu, 0.01 – 0.09 mg/kg for Cr, 0.01 – 0.13 mg/kg for Pb and 0.05 – 0.13 mg/kg for Cd. All resulted concentrations were under the recommended limits set by WHO/FAO. The estimated daily intake values were calculated and compared with tolerable daily intake. The resulted values pose no health risks because a large amount of mushroom should be consumed for heavy metal toxicity to happen. The study indicates that 25% - 50% white cotton textile wastes are suitable as a sustainable substrate for cultivating oyster mushroom, waste reduction and food security. It also suggests that there is a need for further experiments on various aspects of mushroom cultivation and testing the availability of additional toxicity contaminants, and micro-plastics before recommending this substrate for long term consumption.

Keywords: *Estimated daily intake, Cotton textile waste, Upcycle, Heavy metals, Pleurotus ostreatus*

Seasonal dynamics of leachate pollution potential at Kerawalapitiya Waste Park in Muthurajawela wetland, Sri Lanka; a Leachate Pollution Index study

S. J. S. Bandara^{1,2}, R. U. K. Piyadasa¹, S. Himanujahn³, E. R. Gunawardhana⁴

¹*Department of Environmental Technology, Faculty of Technology, University of Colombo, Sri Lanka*

²*Central Environmental Authority, Sri Lanka*

³*Department of Civil and Environmental Technology, Faculty of Technology, University of Sri Jayewardenepura, Sri Lanka*

⁴*Department of Biosystems Technology, Faculty of Technology, University of Sri Jayewardenepura, Sri Lanka*

This study investigates seasonal variations in the potential of leachate contamination at Kerawalapitiya Waste Park; the largest open waste dump located in Muthurajawela wetland. The study measured contamination potential across three seasonal periods through the Leachate Pollution Index (LPI) during a three-year monitoring period from 2022 to 2024 with 36 samples collected monthly. This study evaluated multiple physicochemical parameters including organic pollutants (BOD₅, COD), inorganic components (pH, EC, TDS), heavy metals (As, Cd, Cr, Cu, Hg, Ni, Pb, Zn, Fe, Mn), major cations and anions, and nutrient indicators (NH₄⁺, NO₃⁻, PO₄³⁻) to emphasize environmental contamination threats to the nearby wetland ecosystem. The study confirmed key differences in potential of leachate pollution among seasons, based on the precipitation levels while total LPI values ranged from 10.0 during the 2023 wet season, (monthly rainfall around 1000 ml) to 37.2 during the 2024 dry season (monthly rainfall less than 300 ml) which indicated moderate to high contamination levels that surpassed environmental standards. The main pollution source consisted of organic matter which reached its maximum level of 80.0 during the 2024 intermediate season (monthly rainfall nearly 500 - 600 ml) although heavy metal contamination showed unpredictable behavior with its highest level of 43.8 during the 2024 dry season. The study revealed that 2024 signified the most hazardous year for the environment since all measured components showed in high contamination levels. The seasonal examination of the monitoring period showed irregular patterns which imply that traditional seasonal management techniques are insufficient for handling intricate relationships between climatic elements and waste composition as well as leachate generation methods. The results emphasize an immediate requirement for improved surveillance procedures along with flexible strategies of pollution management which can be adapted to time-based changes in composition of contamination. This study shows that leachate pollution potential peaks during dry seasons, underscoring the need for season-specific monitoring and treatment strategies to protect the Muthurajawela wetland.

Keywords: Contamination, Leachate Pollution Index (LPI), Muthurajawela wetland, Seasonal variation

Assessing the applicability of global loss and damage frameworks in national and local policies to address climate-induced loss and damage in Sri Lanka

E. M. K. S. Ekanayake¹, W. G. K. Withana¹, R. U. K. Piyadasa²

¹*National Building Research Organization, Sri Lanka*

²*Department of Environmental Technology, Faculty of Technology, University of Colombo, Sri Lanka*

Sri Lanka, one of the most climate-vulnerable nations in South Asia, continues to face severe socio-economic and environmental disruptions from climate-induced disasters. While global attention to Loss and Damage (L&D) has grown through mechanisms such as the Warsaw International Mechanism (WIM) and Article 8 of the Paris Agreement, a significant gap remains between policy frameworks and their integration into national and sub-national governance. This study assesses the applicability of global L&D frameworks in Sri Lanka's national and local policies, plans, and regulations, identifying gaps and offering recommendations for better alignment. Using a qualitative research design, it combines literature review, content analysis, and expert consultations. A multi-criteria evaluation framework was developed around five globally recognized L&D components: slow onset events, non-economic losses, migration and human mobility, comprehensive risk management, and action and support. Seven national policies and regulations, together with three local development plans from Kalutara District, selected for their high exposure to floods, coastal erosion, and livelihood vulnerabilities, were assessed against these components. Findings show a critical shortfall in integrating L&D principles, especially regarding non-economic losses and migration. Some policies align with rapid-onset hazards, but others fail to systematically incorporate human mobility, financial mechanisms, or international cooperation tools. For example, slow onset events are partly addressed through forecasting; non-economic losses appear only in cultural and biodiversity references; risk management stresses early warning and resilient village initiatives; migration is limited to a displacement guideline; and support and action mainly rely on international funding. Local-level integration remains weak, with development plans lacking structured climate policy framing or operational strategies. The study concludes that while policy infrastructure exists, it lacks depth and coherence in covering the full scope of L&D. By situating this analysis at both national and district levels, the study addresses a key gap in scholarship by examining how global L&D frameworks are reflected in Sri Lanka's governance. It recommends institutionalizing L&D in planning, establishing dedicated funding streams, and strengthening multi-level governance coordination. Addressing these areas will be essential for Sri Lanka to build resilience and respond effectively to irreversible climate impacts.

Keywords: *Loss and damage, Climate change, Sri Lanka, Policy integration, UNFCCC*

Bioplastic production from Guinea grass (*Megathyrsus maximus*)

B. D. A. Navodha, K. A. Sirisena

Department of Environmental Technology, Faculty of Technology, University of Colombo, Sri Lanka

Plastic pollution and dispersal of invasive plant species are among the most crucial environmental issues globally, contributing to ecosystem degradation and biodiversity loss. This study explores the potential of producing biodegradable plastics using cellulose extracted from the leaf biomass of an invasive grass *Megathyrsus maximus*. By converting an ecologically harmful species into a sustainable raw material, this research aims to provide an integrated solution to reduce the environmental impact of synthetic plastics while contributing to the management of invasive plant species. Three bioplastic formulations were prepared by combining *M. maximus* leaf cellulose with different additives: BPS1 (commercial starch), BPS2 (hydroxypropyl methylcellulose - HPMC), and BPS3 (*Alocasia macrorrhizos* tuber starch). Each sample was evaluated for moisture content, water interaction properties, mechanical strength, biodegradability, and surface morphology. Among the three formulations, BPS2 demonstrated the highest biodegradability (100%) and elongation at break ($21.75 \pm 0.02\%$), indicating strong eco-friendly potential and flexibility. However, it also exhibited poor mechanical performance (tensile strength 0.13 ± 0.05 MPa) and higher water solubility (100%). BPS3 showed the best overall properties with the highest tensile strength (1.49 ± 0.01 MPa), low moisture content ($1.190 \pm 0.29\%$), low water solubility ($25.72 \pm 0.27\%$), and superior morphology as confirmed by SEM analysis. BPS1 performed moderately in most aspects but had higher water absorption ($48.59 \pm 0.43\%$). While BPS2 is most biodegradable, BPS3 offers a more balanced and durable formulation, making it more suitable for practical applications that require strength and structural stability. Overall, the findings confirmed that the cellulose extracted from *M. maximus* can be effectively used in bioplastic production.

Keywords: *Megathyrsus maximus*, *Alocasia macrorrhizos*, Bioplastic, Cellulose, Starch

Comparative analysis of ancient and modern clay bricks: Insights from compressive strength and microstructural characterization

K. D. H. J. Premarathne¹, R. U. Halwatura², S. M. Young³, T. Mendis⁴, R. M. Padmaja⁵

¹*Department of Architecture, General Sir John Kotelawala Defence University, Sri Lanka*

²*Department of Civil Engineering, University of Moratuwa, Sri Lanka*

³*Department of Environment Technology, Faculty of Technology, University of Colombo, Sri Lanka*

⁴*Department of Archaeology and Heritage Management, Rajarata University, Sri Lanka*

⁵*School of Architecture, Sri Lanka Institute of Information Technology, Sri Lanka*

Burnt clay brick has been a fundamental construction material since ancient times. Ancient burnt clay brick structures reflect the advancement of ancient brickmaking technology in Sri Lanka. In contrast, there are inconsistencies in modern burnt clay brick production in relation to the strength, sizes and performances. Therefore, the objective of the research was to compare the ancient burnt clay bricks with modern burnt clay bricks in terms of compressive strength, morphology and elemental concentration. To achieve the objective, seventeen ancient burnt clay bricks were collected from ten stupas located in Anuradhapura, Sri Lanka, while modern bricks were collected from five areas within the Anuradhapura district. Compressive strength testing was conducted in accordance with the Sri Lankan Standards 39: 1978. Additionally, scanning electron microscopy (SEM) with energy-dispersive X-ray spectroscopy (EDX) was used to analyse the microstructural characteristics and elemental concentrations of both ancient and modern clay bricks. The research found that the compressive strength of the ancient bricks was significantly higher than (ranging from 2.68 MPa to 9.78 MPa) modern bricks (ranging from 0.95 MPa to 3.99 MPa). Furthermore, it was proven that different sizes of bricks were strategically placed in ancient stupas according to the compressive strength. The comparison of morphology in both ancient and modern clay bricks indicated a significant impact of residual porosity and microstructures on compressive strength. Additionally, the research emphasised the influence of higher firing temperatures on the ancient burnt clay bricks compared to the modern clay bricks, which contributes to their improved compressive strength. The significant amount of carbon content in ancient bricks suggests that organic additives would have been used to strengthen the bricks. Finally, the higher concentrations of aluminium oxide and iron oxide contributed to the high strength of ancient bricks, further reflecting the advancement of ancient burnt clay brick technology.

Keywords: *Ancient burnt clay bricks, Modern burnt clay bricks, Compressive strength, Microstructure, SEM-EDX*

Sequencing batch reactor for a sewage water treatment plant for the removal of nutrients

H. M. N. Priyashantha¹, K. A. Serisena¹, U. G. N. P. Darshani², S. A. T. D. Sakalasuriya²,
C. Hewawasam²

¹*Department of Environmental Technology, Faculty of Technology, University of Colombo, Sri Lanka*

²*Department of Civil and Environmental Technology, Faculty of Technology,
University of Sri Jayewardenepura, Sri Lanka*

Discharging of untreated or partially treated wastewater from domestic and institutional sources presents significant threats to public health and aquatic ecosystems, due to high concentrations of organic loads and nutrients. These high nutrient levels can cause eutrophication, which degrades water quality, while high organic loads increase biochemical oxygen demand (BOD) in the receiving water. This study evaluated the performance of a laboratory-scale Sequencing Batch Reactor (SBR) to treat sewage wastewater. The SBR is a modified activated sludge process that is time-based and integrates the phases of filling, reacting, settling, and decanting within a single tank. The aim of the study was to assess the efficiency of the SBR in removing key pollutants like, Total Suspended Solids (TSS), Total Dissolved Solids (TDS), Ammonia-N, nitrates, nitrites, and total phosphorus (TP) as well as in reducing Chemical Oxygen Demand (COD). The treated effluent quality was compared with Sri Lankan effluent discharge standards. The SBR was operated continuously for 68 days, and samples were collected and analyzed to evaluate its performance. The results showed that the SBR was effective in treating municipal wastewater loads. The average removal efficiencies were 72.41% for COD, 59.64% for TSS, 33.22% for TDS, 34.82% for Ammonia-N, and 55.53% for TP. The treated effluents were within the Sri Lankan discharge standards for COD, TSS, pH, and Ammonia-N, where TP concentrations remained above the limit. The study concluded that the SBR system can integrate biological nutrient removal and organic matter degradation within a compact, single-tank reactor. By using time-based aeration, the system reduces its reliance on continuous aeration and external chemical dosing, making it a more cost-effective and environmentally sustainable option compared to conventional systems. Future research needs to focus on advanced operational controls and adaptive cycle optimization to enhance the system's strength and nutrient removal efficiency.

Keywords: *Sequencing batch reactor, Wastewater treatment, Nutrient removal, Sewage, Biological treatment*

Geotechnical and environmental evaluation of tunnel muck as a sustainable road filling material

S. Suvaki¹, M. I. Sudasinghe¹, J. L. D. T. Wijegunasekara²

¹*Department of Environmental Technology, Faculty of Technology, University of Colombo, Sri Lanka*

²*Natural Resource Management, Laboratory Services, Central Engineering Consultancy Bureau, Sri Lanka*

Large volumes of tunnel muck in Sri Lanka are commonly discarded, despite potential reuse in transport infrastructure. This study evaluates the geotechnical performance and environmental suitability of tunnel muck from the Habarana-Anuradhapura Tunnel Project to determine its viability as a sustainable road-filling (sub-base/subgrade) material. Homogenized muck was processed to 10 mm nominal maximum size and tested following ASTM/BS EN standards. A focused test suite was selected to quantify key functions: Proctor compaction, Aggregate Impact Value (AIV), Flakiness Index (FI), and California Bearing Ratio (CBR). The material exhibited an optimum moisture content of 5.3% and a maximum dry density of 2.34 gcm^{-3} , consistent with typical sub-base aggregates. $\text{AIV} = 29.4\%$ indicates moderate resistance to impact fragmentation, while $\text{FI} = 65\%$ reflects a flaky gradation more appropriate for light- to medium-duty pavement layers or for blending/crushing prior to heavier-duty applications. Bearing capacity was adequate, with $\text{CBR} = 35\%$ (unsoaked) and 21% (soaked), supporting use in road sub-base and subgrade under normal traffic. A screening life-cycle comparison suggests that in-situ reuse of tunnel muck could reduce greenhouse-gas emissions by up to $\sim 40\%$ relative to quarry-derived aggregates, primarily by avoiding extraction and reducing transport. Overall, the results demonstrate that tunnel muck can be repurposed as an environmentally friendly road sub-base/subgrade material, advancing circular-economy practices in Sri Lanka while diverting waste and lowering emissions. The findings provide a practical evidence base for agencies to adopt specification-compliant reuse pathways with appropriate processing.

Keywords: *California Bearing Ratio, Circular economy, Lifecycle assessment, Road-subbase, Tunnel muck*

Innovative approaches in agricultural technology for early drought detection using Earth Observation data

M. Bandara¹, R. U. K. Piyadasa²

¹*UN World Food Programme, Sri Lanka*

²*Department of Environmental Technology, Faculty of Technology, University of Colombo, Sri Lanka*

Drought is one of the most severe climate-related hazards affecting Sri Lanka, where a large share of the population depends on rain-fed agriculture for livelihoods and food production. Prolonged dry spells lead to substantial crop failures, economic instability, and rising food insecurity. However, existing drought monitoring and early warning systems in the country remain inadequate: they often lack regional specificity, rely on fragmented datasets, and fail to provide timely alerts that farmers and decision-makers can act upon. To address this critical gap, the present study develops a region-specific drought early warning framework that leverages freely available satellite data from MODIS and Sentinel, combined with drought indices such as the Normalized Difference Vegetation Index (NDVI), Vegetation Condition Index (VCI), and Temperature Condition Index (TCI). Through time-series analysis of remote sensing data, the system detects vegetation stress and surface temperature anomalies that signal drought conditions several weeks before visible impacts occur. Validation with historical drought records and agricultural observations shows improved sensitivity in identifying early warning signals across multiple agro-ecological zones. The framework emphasizes cost-effectiveness and scalability by relying on open-access data and cloud-based geospatial processing, removing the need for expensive ground-based infrastructure. Importantly, outputs can be translated into practical tools such as drought maps and near-real-time alerts, supporting adaptation measures like irrigation planning, crop diversification, and land-use management. By directly targeting the lack of timely, locally relevant drought information, this research provides an operational solution to strengthen resilience among farming communities. Beyond Sri Lanka, the framework presents a transferable model for drought-prone regions worldwide, demonstrating the broader potential of Earth Observation technologies to enhance sustainable agriculture and food security under changing climate conditions.

Keywords: *Agro-ecological zones, Climate risk management, Vegetation stress monitoring, Remote sensing applications, Food security resilience*

Valorization of food processing sludge through biochar production and application as a soil amendment in sustainable agriculture

S. M. Bandusena¹, J. J. Wewalwela², T. N. Dharmapriya¹

¹*Department of Environmental Technology, Faculty of Technology,
University of Colombo, Sri Lanka*

²*Department of Agricultural Technology, Faculty of Technology, University of Colombo, Sri Lanka*

The food industry ranks among the largest contributors to global wastewater production and generates substantial amounts of food processing sludge. This growing accumulation and improper disposal of food processing sludge poses serious environmental challenges, necessitating sustainable waste management strategies. This study was designed with the objective of assessing the potential of converting food processing sludge into sludge-derived biochar (SDBC) and assess its effectiveness as a soil amendment in comparison to directly dried sludge (DDS). The raw dewatered sludge collected from an ice cream and beverage industry was pyrolyzed at 300°C and 500°C for 3 hours in a muffle furnace to produce biochar, SDBC300, and SDBC500, respectively. The enhanced properties of biochar were evaluated through biochar yield determination, proximate analysis, Scanning Electron Microscopy (SEM), Attenuated Total Reflectance–Fourier Transform Infrared (ATR-FTIR) spectroscopy, and X-ray Diffraction (XRD). Pyrolysis results showed that at 500°C, the biochar yield was 50.49 wt% with a fixed carbon content of 36.85 wt%. Increasing the pyrolysis temperature from 300°C to 500°C resulted in a 26.9% reduction in biochar yield. The parameters such as pH, electrical conductivity (EC), C/N ratio, total phosphorus (TP), and total potassium (TK) exhibited an increasing trend with higher pyrolysis temperatures, while organic carbon and total nitrogen (TN) decreased with increasing temperature. Soil (pH = 5.02) was amended with DDS, SDBC300, and SDBC500 at three different concentrations: 1%, 2% and 5% of its dry weight, with five replications. Three weeks old *Capsicum annum* (chilli) plants were transferred to the pots and grew for 60 days. Soils amended with 1% SDBC300 biochar demonstrated higher biomass yield, chlorophyll content, and plant height compared to other treatments. These findings underscore the potential of low-dose SDBC300 as an effective bio-based soil amendment, supporting the sustainable reuse of food industry sludge in sustainable agriculture.

Keywords: *Food processing sludge, Directly dried sludge, Pyrolysis, Sludge derived biochar, Soil amendment*

Evaluation of secondary biomass feedstocks for densified bio-pellet production

S. Dharshani¹, S. Sayanthan², R. G. R. N. K. Ariyaratne¹

¹*Department of Environmental Technology, Faculty of Technology, University of Colombo, Sri Lanka*

²*Department of Biosystems Technology, Faculty of Technology, University of Jaffna, Sri Lanka*

The global and national energy crisis is intensified by the environmental impacts and scarcity of conventional energy sources. This study assesses the suitability of locally available biomass residues, such as banana-peel, and corncob, for bio-pellet production, aiming to meet the country's energy demand and reduce reliance on imported fossil fuels. The main objective was to investigate the energy capacity and combustion performance of these non-woody feedstocks. Prior to pelletization, each type of biomass was sun-dried, oven-dried, ground and sieved to ensure the uniform particle size. The produced pellets were tested in terms of their physicochemical, combustion, and mechanical properties according to the requirements of ISO 17225-2 and 6. Neem wood pellets were used as the control group to compare the performance of non-woody pellets made from banana-peel, corncob and banana-peel: corncob blend (1:1 W/W). The results showed that, among the non-woody pellets, the banana-peel pellet was the most effective with the highest calorific value (17.85 ± 0.25 MJ/kg), favourable Specific Fuel Consumption (SFC) (196.00 ± 1.5 g/l) and lower burning-rate (0.92 ± 0.02 g/min). Further, a bluish flame was observed during combustion, which indicates a cleaner energy release. However, the lowest compressive strength (2538.87 ± 282.03 Pa) suggests handling limitations. Additionally, banana-peel + corncob blended pellets have a compressive strength (8322.66 ± 1393.92 Pa) better than either of the individual non-woody feedstocks with moderate calorific value (17.23 ± 0.12 MJ/kg), favourable SFC (194.6 ± 2.95 g/l) and burning-rate (1.33 ± 0.04 g/min). In contrast, corncob pellets showed lower compressive strength (6615.36 ± 348.18 Pa), lower calorific value (16.83 ± 0.22 MJ/kg), moderate SFC (264.20 ± 3.2 g/l) and higher burning rate (1.42 ± 0.03 g/min). In conclusion, the findings showed that banana-peel pellets demonstrated the most efficient non-woody feedstock, aligning with the ISO standard and comparable combustion characteristics to wood-pellets, making them promising candidates for clean, affordable, and sustainable bio-pellet applications.

Keywords: *Bio-pellets, Characterization, Densification, Non-woody biomass, Renewable energy*

Environmental assessment of plasticizer contamination in leachate sediments from open dumpsites in Sri Lanka

W. H. D. Shehara^{1,2}, C. Manangodage², T. N. Dharmapriya¹, A. U. Rajapaksha^{2,3},
S. Ramanayaka⁴, M. Vithanage^{2,5}

¹*Department of Environmental Technology, Faculty of Technology, University of Colombo, Sri Lanka*

²*Ecosphere Resilience Research Centre, Faculty of Applied Sciences,
University of Sri Jayewardenepura, Sri Lanka*

³*Instrument Center, Faculty of Applied Sciences, University of Sri Jayewardenepura, Sri Lanka.*

⁴*Lancaster Environment Centre, Lancaster University, LA1 4QY United Kingdom*

⁵*Department of Geochemistry, Geological Survey of Denmark and Greenland, Copenhagen, Denmark*

In Sri Lanka, open landfilling predominates, producing leachate that carries plasticizers from degrading plastics and accumulates in sediments through adsorption. Plasticizers such as Bisphenol A (BPA), Benzophenone (BP), and Di(2-ethylhexyl) phthalate (DEHP) are widely used in plastic manufacturing and have known endocrine-disrupting effects even at low concentrations. Yet there is a lack of detailed research on the occurrence and distribution of plasticizers in leachate-impacted sediments in Sri Lanka. This study investigated the abundance of BPA, BP, and DEHP in sediments from 10 major open dumpsites across the Western Province. Twenty-one sediment samples were collected and subjected to solvent extraction using dichloromethane to effectively isolate plasticizers from sediments. Extracts were analyzed using High Performance Liquid Chromatography (HPLC) equipped with a UV-Visible detector (Limit of Detection - 0.01 ppm). The analysis revealed BPA, BP, and DEHP concentrations in sediments ranged from 0 - 7045.0 µg/kg, 0 - 713.9 µg/kg, 0 - 6930.9 µg/kg, respectively. Phthalate (DEHP) was identified as the most abundant plasticizer, likely due to its strong hydrophobicity, high persistence and strong affinity to organic carbon in sediments while the highest DEHP level was observed in sediments from the Kochchikade (6930.9 ± 1690.8 µg/kg), Avissawella (3424.6 ± 771.8 µg/kg), and Karadiyana (2761.7 ± 123.9 µg/kg), attributed to comparatively high volume of plastic waste disposed and poor leachate management practices, enhancing the leaching and accumulation of plasticizers in underlying sediments. In contrast, BP and BPA concentrations show comparatively moderate levels, reflecting their relatively lower persistence. Karadiyana dumpsite exhibits elevated BPA levels (7045.0 ± 83.6 µg/kg, 720.3 ± 83.6 µg/kg), while the highest BP concentration was detected in Avissawella (713.9 ± 199.6 µg/kg). These findings show that BPA, BP, and DEHP significantly impair sediment quality in municipal solid waste dumpsites, highlighting the need for better landfill design, leachate treatment, and long-term monitoring to mitigate plasticizer contamination.

Keywords: *Bisphenol A, Benzophenone, Di(2-ethylhexyl) phthalate, Leachate-impacted sediments*

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Investigation of bamboo-derived adsorbents for water treatment: Challenges in water hardness removal caused by calcium and magnesium ions

I. S. Wickremasinghe¹, R. M. M. K. Karunathilaka², T. N. Dharmapriya¹, N. Priyantha³

¹*Department of Environmental Technology, Faculty of Technology, University of Colombo, Sri Lanka*

²*Research and development unit, Faculty of Medicine, University of Peradeniya, Sri Lanka*

³*Department of Chemistry, Faculty of Science, University of Peradeniya, Sri Lanka*

Bamboo is a renewable, low-cost biomass that has gained attention as a sustainable adsorbent for water purification. This study explored the potential of bamboo-derived adsorbents for removing calcium (Ca^{2+}) and magnesium (Mg^{2+}) ions, the main contributors to water hardness. Raw bamboo leaves and stems, chemically modified using NaOH, HNO_3 , and EDTA, as well as bamboo-derived biochar, were investigated. Biochar was prepared by pyrolyzing bamboo stems at 500, 600, and 700°C for 1 hour and bamboo leaves at 250, 300, 350, and 400°C for 30 minutes to enhance porosity and surface reactivity. Characterization of adsorbents was carried out using SEM, FTIR, XRD, XRF, and methylene blue surface area analysis. SEM showed a porous surface favorable for methylene blue adsorption, while FTIR confirmed C-H, Si-O groups involved in binding. XRD indicated a low-crystallinity amorphous structure typical of lignocellulosic biomass. The Surface area of the adsorbent was 9.30 m²/g. Batch adsorption with AAS analysis showed raw bamboo had low or negative removal, with XRF confirming desorption of native Ca and Mg ions. To improve performance, chemical modifications and biochar production were tested; however, among modifications, NaOH (0.1 M) achieved the highest removals, with 25.61% for Ca^{2+} using bamboo stem and 34.53% for Mg^{2+} using bamboo leaves. HNO_3 , dual acid–alkali treatments, and EDTA modification provided only marginal improvements ($\leq 13.49\%$ for Ca^{2+} and $\leq 3.50\%$ for Mg^{2+}), while some conditions resulted in desorption. Comparative testing of other natural biosorbents including rice husk, coconut coir, banana peel, *Panicum maximum*, tea waste, *Eichhornia crassipes*, and areca nut husk also showed poor performance. These findings highlight limitations of untreated or modified biomass for hardness ion removal, stressing the need for advanced activation to improve functional groups, porosity, and ion exchange. Bamboo has potential as a sustainable adsorbent, but current forms are ineffective, needing chemical activation and process optimization.

Keywords: *Bamboo, Water hardness, Adsorption, Biochar, Modification*

Bioelectrical signal responses of *Mimosa pudica* L. (Nidikummba) to instant light–dark transitions

L. D. G. Jayathilake, I. B. Abeywickrama, V. A. P. Senevirathna, B. L. S. Thilakarathne

*Department of Instrumentation and Automation Technology, Faculty of Technology,
University of Colombo, Sri Lanka*

Mimosa pudica L. (Nidikummba) shows highly sensitive electrophysiological responses to environmental stimuli. Consequently, the bioelectrical signals are a promising basis for plant-based ecological sensing and monitoring applications. Thus, this study investigates the plant's electrical activity under instantaneous light-dark transitions (0-1200 lux) in controlled indoor settings. A custom-built data acquisition system using an ESP32 microcontroller and AD620 instrumentation amplifier was used to record millivolt-level electrophysiological signals alongside synchronized environmental sensor data. Experiments were conducted over multiple days in three phases by isolating the effects of key factors: constant illumination with naturally fluctuating climate and periodic light–dark transitions. The recorded signals were processed with digital signal processing techniques, including baseline drift correction, 4th-order Butterworth low-pass filtering, Savitzky–Golay smoothing, and FFT-based noise filtering to enhance signal clarity. Distinct electrical patterns were observed, including rapid action potentials (~15 mV to ~69 mV) triggered by instant light transitions (dark), and then showed variation potentials (~15 mV to ~100 mV) in response to light on condition. These results confirmed that *M. pudica* produces clear, measurable electrical responses to instant light–dark transitions, validating it as a viable living biosensor. The real-world experimental approach underscores the originality of using a plant under natural conditions, and it lays the groundwork for integrating plant bioelectrical signals into future predictive environmental monitoring systems.

Keywords: *Mimosa pudica*, Plant electrophysiology, Bioelectrical signals, Environmental monitoring, Biosensor

Design and experimental testing of a load cell-integrated active suspension system for terrain-adaptive mobile robots

Y. H. I. K. Sadeepana, W. C. N. H. B. Wijerathna, G. C. C. Rukshan, K. D. R. N. Kalubowila

*Department of Instrumentation and Automation Technology, Faculty of Technology,
University of Colombo, Sri Lanka*

Instability and reduced adaptability are often encountered by mobile robots when operating on rough terrain. To address this, a passive suspension system is converted into an active suspension system. A cost-effective prototype has been developed and experimentally validated to demonstrate improved stability and mobility. This paper presents a quarter-car model of an active suspension system that uses a motor-driven linear actuator and load cell to provide real-time force feedback to a PID control algorithm, which controls the linear actuator to maintain chassis stability. The mechanical parts were 3D printed to develop a linear actuator with a lead screw, enabling accurate vertical movement. The process variable was the load cell's feedback, whereby the actuator response was dynamically adjusted to provide a stable chassis orientation under changing load and terrain conditions. The system operates at a variety of angles and speeds, with optimal stability observed at 0.0667 m/s on incline angles and 0.0167 m/s on decline angles, reducing chassis angular deviations to $\pm 1.2^\circ$. The results showed that the load cell-integrated linear actuator strut assembly improves suspension adaptability while maintaining quarter-car model stability, demonstrating a cost-effective approach that could enhance mobile robots' robustness for applications in autonomous vehicles, agriculture, and exploration.

Keywords: *Active suspension, Mobile robot, PID control, Terrain adaptability, Load cell*

Design and development of a modular 5-axis CNC milling machine for small and medium enterprises (SMEs)

K. M. G. S. U. Kariyawasam, A. G. M. Bandara, M. S. I. Hussain, U. V. H. Sameera

*Department of Instrumentation and Automation Technology, Faculty of Technology,
University of Colombo, Sri Lanka*

Computer Numerical Control (CNC) technology has been evolving rapidly over the last few decades, facilitating various industrial applications with high precision and speed. 5-axis CNC machines are utilized to fabricate complex components by allowing the cutting tool to approach the workpiece from different orientations. Due to the higher price of 5-axis CNC machines, SMEs struggle to expand their operations by utilizing these technologies. This research study focuses on developing an affordable and modular 5-axis CNC machine that can handle soft materials such as wood, plastic and soft metals; aluminum and copper. The system features executing both milling and laser engraving functions separately. Design started with conceptualizing, and the CAD model was developed using SolidWorks (2024 service pack 4). Comprehensive simulations were done to validate the mechanical stability of the system. NEMA 23 stepper motors with TB6600 motor drivers were used for actuating X, Y and Z axes and NEMA 17 stepper motors with A4988 motor drivers were used for handling A and B axes. The Arduino-Mega-2560 controller was selected for controlling the system and GRBL Mega 5X open-source firmware was installed successfully. Natural air cooling was sufficient to meet the cooling requirement of the machine, since this system is developed for handling soft materials. The precision of the motions was ensured using CN5X++ software, achieving 1 mm movement per 1 step for linear axes (X, Y, Z) and 1° movement per 1 step for rotational axes (A, B). This machine has a working envelope of 30×30×30 cm³. Tests were carried out using nylon cubes which resulted maximum deviation of ±0.06 mm. There was a maximum ±0.03 mm deviation between same size work pieces when repeating. By developing a cost effective and modular 5-axis CNC machine, this study facilitates SMEs and hobbyists to improve their outcomes more efficiently.

Keywords: 5-axis CNC milling machine, Modular design, Small and Medium Enterprises (SMEs)

Machine learning based defect detection system for boundary laminated fabric accessories

W. K. S. Viduranga, H. Y. R. Atapattu, P. L. C. S. Silva

*Department of Instrumentation and Automation Technology, Faculty of Technology,
University of Colombo, Sri Lanka*

The use of automated solutions for inspection processes in the textile manufacturing industry for raw material inspection has been trending in the last few decades to eliminate inconsistencies and inefficiencies in manual inspection. However, it is still prominent in the final inspection of complex garment accessories, such as boundary laminated fabric accessories, which feature a narrow adhesive lamination (a few millimeters wide) along their edges, bonded with a removable backing paper. Since traditional image processing lacks robustness for such applications, while collecting large datasets of defects to train deep learning algorithms is hardly practical, this research focuses on exploring the effectiveness of machine learning for inspection, specifically using a random forest classifier-based semantic segmentation model (RFCSS). The developed defect detection algorithm uses the RFCSS model to segment the input images and uses those segmented images as input for defect analysis. To train the RFCSS model, 17 texture features and 05 colour features were used. The dataset used was comprised of 48 images (training: 38 images, testing: 10 images) having 720×1280 pixels resolution, producing over 35 million datapoints for training the model to classify every single pixel into one of the classes from the fabric, background, lamination backing, stains, and yarn damage. Further, a prototype inspection conveyor equipped with a Google Pixel 6A as the input camera, comprising an illumination chamber, was developed to evaluate the real-world performance of the algorithm. A Graphical User Interface was designed and developed using Python and Tkinter to control the inspection process, while providing live footage and a detailed status of each test subject. Regardless of the accuracy of 99.95% produced by the RFCSS model in segmentation of test images, the mean intersection over union (IoU) only reached 82.86% due to the heavy imbalance of the number of pixels corresponding to undamaged fabric portions and the background, compared to small defects like yarn damage (IoU for yarn damage: 38.41%). The defect detection on the prototype produced an accuracy of 77.5% with a recall of 70.96%, and an F1 score of 83.02% in trials carried out using 40 boundary laminated accessories.

Keywords: *Machine learning, Semantic segmentation, Fabric accessories, Fabric inspection, Automation*

3D printed gyroid lattice structures from recycled PET (rPET) for electric vehicle battery crash protection

K. W. S. N. Wijesundara, C. D. S. Kelum, E. M. J. C. Ranasinghe, K. D. R. N. Kalubowila,
K. M. G. S. U. Kariyawasam

*Department of Instrumentation and Automation Technology, Faculty of Technology,
University of Colombo, Sri Lanka*

The rapid growth of electric vehicles into urban and commercial transportation has driven the need for a lightweight but strong battery enclosure capable of withstanding impacts and vibrations during a vehicle crash. Since most rechargeable batteries are prone to mechanical failure and fires upon collision or impact, advanced crash-resistant structural solutions need to be deployed to ensure the safety of the driver and system functionality. Simultaneously, sustainable engineering practice is a prime necessity as reflected in the rising plastic pollution due to the accumulation of non-biodegradable waste in the environment. Recycling and reusing industrial and post-consumer plastics are necessary to reduce damage to the environment and promote circular production. To overcome the issues of sustainability and safety, this study proposes the optimum gyroid lattice structures fabricated by fused deposition modeling (FDM) 3D printing with recycled plastic for crash protection applications. In the current research, recycled polyethylene terephthalate (rPET) was used from industrial broom wastes derived from post-consumer plastic bottles as a viable and sustainable material option. Due to the diameter difference, the industrial broom waste rPET filament was extruded using a redesigned filament extruder integrated into the FDM 3D printer. This allowed continuous material feeding during the printing process. Quasi-static compression was employed to test gyroid geometries that were printed. The best strength-to-weight ratio was observed in the 12 mm cell size 25% relative density configuration, indicating excellent crashworthiness that is favorable for safety parts in electric vehicles. The gyroid lattice structures offer an environmentally friendly, lightweight, and extremely low-cost battery protection solution by substituting the conventional solid or foam-filled crash protection components with optimized gyroid lattice structures made of industrial rPET waste. This material innovation combines mechanical and other functionalities, offering a scalable solution to advance concepts of circular economy in future-proof electric mobility solutions.

Keywords: *Recycled polyethylene terephthalate (rPET), Gyroid lattice, Fused deposition modeling (FDM), Quasi-static compression, Strength-to-weight ratio*

Development of a device to detect *in vitro* derived glycated proteins based on the fluorescence quenching properties of graphene oxide

N. A. Malagala¹, B. P. N. Kumara¹, W. P. P. Kaweesha¹, H. Y. R. Atapattu¹,
W. K. S. M. Abeysekera², N. Abeyasinghe³, J. K. D. S. Jayanetti¹

¹*Department of Instrumentation and Automation Technology, Faculty of Technology,
University of Colombo, Sri Lanka*

²*Department of Agricultural Technology, Faculty of Technology, University of Colombo, Sri Lanka*

³*Department of Chemistry, Faculty of Science, University of Colombo, Sri Lanka*

Glycated proteins (GPs), produced through the non-enzymatic glycation of proteins by glucose, are emerging biomarkers for early diabetes diagnosis. This study reports a fluorescence-based mechanism to detect *in vitro* derived GPs and its development into a prototype sensing device. Graphene Oxide (GO) was synthesized using the Improved Hummers method, while GPs were produced through a BSA-glucose model. Fluorescence studies were carried out in 96-well microplates ($n = 3$) using a 300 μL reaction volume containing 100 μL of GO (1.0 mg mL^{-1}), varying GP concentrations ($7.5 - 37.5 \mu\text{M mL}^{-1}$), phosphate buffer (pH 7.4), and distilled water (emission: 370 nm, excitation: 440 nm). By adopting the fluorescence quenching behaviour of GO, a GPs detection mechanism was established, and a prototype device was designed and developed using an Arduino Nano, UV LED (370 nm), collimator lens, narrow band pass filter (440 nm), and TSL257 light-to-voltage sensor. The structural components of the device were designed in SolidWorks and 3D printed to have a precise device configuration. The real-time results were displayed using an LCD (16×2). The fluorescence spectra revealed the quenching effect of GO against GPs, which is highly dose-dependent in the concentration range of $7.5 - 37.5 \mu\text{M mL}^{-1}$. The highest $|\Delta \text{Fluorescence Intensity}|$ was observed at 420 - 430 nm, with the secondary peak at 440 nm. The $|\Delta \text{Fluorescence Intensity}|$ exhibited a linear relationship with GP concentration ($R^2 = 0.9927$), validating GO as a potential sensing material. Further, the developed device (30 replicates per concentration) confirmed consistent light-to-voltage responses with minimum intervention against distilled water, buffer, and BSA while showing a baseline voltage of 0.03 V for GO, confirming its minor inherent fluorescence properties. The device demonstrated a strong linearity and precision (STD: 0.022 to 0.037 V) while exhibiting an average device accuracy of 94.88%. Further improvements in the repeatability and accuracy of voltage responses may lead to potential testing in biological matrices, allowing fabrication of a point-of-care device for early detection of diabetes.

Keywords: *Glycated proteins, Fluorescence quenching, Graphene oxide, Biosensor, Diabetes diagnosis*

Design and development of an energy harvesting unit: A smart energy harvesting unit for highways in Sri Lanka

S. N. N. W. W. G. R. T. Abesiri, M. M. T. D. K. Madurusingha, N. M. V. Weerasingha,
U. V. H. Sameera, P. A. G. M. Amarasinghe

*Department of Instrumentation and Automation Technology, Faculty of Technology,
University of Colombo, Sri Lanka*

The global shift toward renewable energy has intensified interest in wind energy, particularly in capturing airflow generated by passing vehicles on highways. The expressway traffic in Sri Lanka is highly responsive, with constant traffic density, and incorporating Vertical Axis Wind Turbines (VAWTs) for power generation is possible. This research proposes and implements an intelligent energy harvesting system tailored for Sri Lankan highways. The methodology included wind data acquisition along highways, conceptual design of VAWTs, material selection, and incorporation of 36-pole permanent magnet generator for efficiency of power conversion at low speed with direct drive technology, eliminating the need for a gearbox, minimizing friction losses. A 10 W solar cell was incorporated to supplement energy generation. To enhance system performance and data acquisition, ESP32 microcontrollers and an IoT-based real-time monitoring dashboard were developed. Simulation and performance analysis were conducted using MATLAB/Simulink to evaluate the generator's RPM versus voltage, current, and power output. Experimental results showed that the optimized two-blade helical VAWT with a 110-degree twist angle generated consistent power at average wind speeds of 6.3 m/s. At 60 RPM, the system produced 21.2 W of power, with a corresponding current of 1.35 A and voltage of 15.7 V. The system demonstrated low maintenance requirements and high feasibility for implementation, making it a viable solution for Sri Lanka's renewable energy initiatives. The real-time dashboard enables continuous performance monitoring and data logging. These findings support the integration of wind energy systems along highways into national energy strategies, contributing to reduced fossil fuel dependency and the advancement of sustainable infrastructure.

Keywords: *Vertical axis wind turbine (VAWT), Renewable energy, Energy harvesting, IoT*

Design and development of a PLC-based semi-automated *Kottu Roti* preparation machine

R. D. S. S. Kulasinghe, J. A. G. D. S. D. Nanayakkara, M. M. S. S. Mannapperuma,
B. L. S. Thilakarathne

*Department of Instrumentation and Automation Technology, Faculty of Technology,
University of Colombo, Sri Lanka*

With the rise in demand for automation in the food industry, there is growing interest in developing machines that can maintain the authenticity of traditional cooking while improving efficiency and hygiene. This research focuses on the development of a Smart *Kottu Roti* machine, which automates the process of preparing *Kottu Roti*, a popular Sri Lankan food traditionally made by skilled chefs. The primary aim is to reduce labour and improve consistency without compromising the taste and texture. The machine was developed using a combination of mechanical, electrical, and software subsystems. Stainless steel and food-grade materials were used for all food-contact parts to ensure hygiene. A PLC-based control system integrated with push buttons allow users to interact with the machine, monitor the process, and select batch modes. A stepper motor-driven mixing system and automated feeding units replicate the chopping and mixing techniques typically done manually. The methodology involved field studies of traditional *Kottu Roti* preparation to understand ingredient order, mixing times, and heating stages. This information was then used to programme the machine's operation using a time-based sequence. Trials showed that the system could prepare a portion of *Kottu Roti* in less than five minutes. Feedback from sensory testing with university students confirmed that the machine-produced *Kottu Roti* was comparable in both taste and texture to manually prepared versions. This project demonstrates that it is possible to preserve culinary heritage while applying modern automation for scalability and efficiency. Future improvements will focus on refining ingredient dispensing and integrating an automated cleaning system.

Keywords: *Kottu Roti machine, Food automation, PLC control, Traditional food processing*

Simulation-based approach to strength evaluation and material optimization in polytunnel structures for protected agriculture

J. A. T. Sandupama¹, U. Rathnathunga², N. A. R. Perera³, B. L. S. Thilakarathne¹

¹*Department of Instrumentation and Automation Technology, Faculty of Technology,
University of Colombo, Sri Lanka*

²*Department of Urban Bioresources, Faculty of Urban and Aquatic Bioresources,
University of Sri Jayewardenepura, Sri Lanka*

³*National Agriculture Information and Communication Centre, Department of Agriculture,
Gannoruwa, Peradeniya, Sri Lanka*

Protected Agriculture (PA) is one of the greatest technological contributions to traditional farming and a promising solution for improving crop productivity, ensuring food security and enhancing resource use efficiency. Poly tunnels are one of the most popular PA systems due to their ability to adapt to climatic changes and prevent pests and diseases. However, poly tunnel structures are still constructed based on informal methods without proper structural evaluation, which can result in structural failure, or the over-use of materials. This research study introduces a simulation-oriented design approach with a standardized procedure to optimize material usage by evaluating the structural strength of the poly tunnel before construction. The mathematical calculation of wind loads acting on the structure is a key focus of this study. These forces are calculated in all possible directions and applied individually to each structural beam in a 3D model designed using SolidWorks based on the structural standard ASCE 7-16. The simulation data allows for detailed analysis to support final decisions. Structural strength and material safety can be evaluated using the stress scale (Factor of Safety), while functionality and serviceability can be assessed using the displacement scale (deflection ratio). In this research, a modified Quonset structure was selected among the existing poly tunnel structural shapes, and several simulations were conducted by including and excluding structural members, as well as re-sizing the shape and structural components. The final simulation results were obtained with 5.893 ± 0.001 safety factor which exceeds the minimum requirement of 1, and (6.603 ± 0.001) mm maximum displacement which is within the allowable displacement limit of 8.889 mm. The proposed method is a replicable procedure ahead of construction that developers, especially beginners can adopt to validate the design based of environmental factors ensuring the stability, strength and material efficiency without compromising reliability.

Keywords: *Modified Quonset structure, Protected Agriculture, ASCE 7-16, Deflection ratio*

Development of an AI-driven semi-automated air rifle system for wild elephant conservation

K. M. G. S. U. Kariyawasam, S. M. M. Hashini, E. R. P. U. Jayarathne,
H. M. P. B. Rathnayaka

*Department of Instrumentation and Automation Technology, Faculty of Technology,
University of Colombo, Sri Lanka*

Dart shooting is a widely used remote drug delivery method in the treatment and conservation of wild elephants. However, conventional dart shooting requires a manual gun operator to handle the gun while remaining inside the effective range, often endangering the life of the gun operator. To address these challenges, this study focuses on the development and optimization of an artificial intelligence (AI) based semi-automated air rifle system for wildlife treatment. A custom-designed pre-charged pneumatic (PCP) valve integrated with a pressure reservoir which can handle 150 atm pressure and a triggering mechanism was developed, executing relevant simulations. The biaxial direction control system powered by a YOLOv8-based object detection system was able to locate and track the elephant in real-time. Through a web-based application interface, the user can activate the firing mechanism remotely after confirming the target while ensuring the safety of the wild animal. The system was adapted to identify a testing target, allowing the system to operate in an experimental environment and an extensive amount of testing was done to evaluate the system's accuracy and precision. With the current limitations of resources and considering safety concerns, all tests were carried out with a constant pressure of 5 atm and the target distances varied from 3.5 m, 5 m to 6.5 m. The results indicated mean deviations of 8.3 cm, 16.7 cm and 30.8 cm for the respective target distances, demonstrating a significant increase in dart dispersion of 8.4 cm and 13.1 cm respectively, with the distances under a constant air pressure at 5 bar. Similarly, the standard deviation values of 1.5 cm, 2.7 cm and 4.7 cm for the distances of 3.5 m, 5 m and 6.5 m, respectively, indicate a relatively high level of precision. Design and development of the AI driven air rifle system has the potential to enhance the safety and efficiency of the remote drug delivery in wildlife management.

Keywords: *Remote drug delivery, Artificial intelligence, Pre-charged pneumatic valve, YOLOv8*

Development of a mobile seed-sowing robot for precision agriculture

K. D. Lakshan, P. A. L. Randima, D. M. L. Dhananjaya, U. S. Mutugala

*Department of Instrumentation and Automation Technology, Faculty of Technology,
University of Colombo, Sri Lanka*

In traditional agriculture, when planting small seeds (e.g., carrot, onion), scattering seeds across mounded beds and removing seedlings that are too close together is the common practice. This practice is inefficient and leads to seed wastage, uneven crop growth and increased labour costs. In this work, a robot capable of sowing individual carrot seeds with typical dimensions <3 mm was developed. The width and the height of the robot can be adjusted to match the dimensions of the mounding bed using telescoping tubes in the chassis. The robot can place seeds in up to ten columns. The user can select the number of columns and the distance between the rows using push buttons. The height of the mounded bed is measured by an ultrasonic sensor and seed sowing stops when the mound bed can no longer be detected. The mobility system of the robot has a two-track layout. Each track has one drive wheel and three idler wheels. The tracks are driven by 12 V DC motors, and torsion springs are incorporated as suspension components to stabilize the robot. The robot utilizes differential steering and a joystick is used to apply course corrections. The seed handling mechanism has two pneumatic nozzles and a movable linear array of ten slots. Each nozzle is actuated by a servo motor and the suction force is generated by a diaphragm pump (HY-4000). The linear array is actuated by a stepper motor (NEMA 17). Once the nozzles pick up individual seeds from a seed container, the movable array aligns its slots with the nozzles enabling the seeds to be placed in the designated slots. The seeds placed in the slots move through flexible tubes and get placed on the mounded bed. Under laboratory conditions, the average seed dispensing time was measured to be approximately 5 s and the accuracy of the robot was measured to be within 2 cm when traversing rows. These results require further validation through field tests.

Keywords: *Automated seed sowing, Precision agriculture, Agricultural automation*

Nanostructured CuO/Cu₂O shish-kebab electrode preparation for metal oxide supercapacitor applications

G. N. Gamage, K. A. H. A. Dilshan, K. A. D. Shehan, G. G. C. Rukshan,
J. K. D. S. Jayanetti, K. D. R. N. Kalubowila

*Department of Instrumentation and Automation Technology, Faculty of Technology,
University of Colombo, Sri Lanka*

The growing demand for high-capacity energy storage has led to an increased focus on developing novel electrode materials for supercapacitors. This work reports the synthesis and characterization of an unprecedented shish-kebab CuO/Cu₂O nanostructure for supercapacitor electrode active material. The electrode was prepared in a multistep procedure which involves anodization of the copper electrodeposited Ti substrate to form Cu(OH)₂ nanowires, thermal annealing for conversion into CuO nanowires, and finally, electrochemical deposition of Cu₂O nanoparticles using an aqueous solution of 0.1M sodium acetate (CH₃COONa) and 0.01M copper acetate (C₂H₄CuO₂) for 20 minutes on the layer of CuO nanowires. For the material characterization, SEM and XRD were used to observe the morphology and crystallinity, which demonstrated the formation of the desired nanostructure of shish-kebab. The CV and GCD tests of the shish-kebab supercapacitor electrode prove the pseudocapacitive charge storage behaviors. The study revealed that the Ti/CuO/Cu₂O shish-kebab nanostructure exhibited excellent performance, with a specific capacitance value of 0.448 F. Hence, these results primarily conclude that the Ti/CuO/Cu₂O shish-kebab nanostructure has given rise to vastly improved charge storage. The findings also lead to a promising approach to the design of advanced supercapacitor electrodes based on copper oxide nanostructures and intermediate energy storage devices.

Keywords: *Supercapacitor, CuO/Cu₂O Nanostructure, Shish-kebab, Pseudocapacitance, Energy storage*

Punchi Panchi: gamified platform for kindergarten using affordances in constructivist teaching-learning with mood recognition

W. S. Kaushalya, A. S. M. Rathnasiri, W. M. S. Nethmika, J. M. C. M. Bandara

*Department of Information and Communication Technology, Faculty of Technology,
University of Colombo, Sri Lanka*

Kindergarten learning is the basic and most important stage of education. Lack of proper primary education can hinder a child's secondary education. In the traditional method, the teacher provides all the knowledge to the children, and the opportunity for children to learn independently is limited. Therefore, the ability of children to learn by making mistakes and to think critically is limited. To overcome this problem, this research introduces Punchi Panchi, an intelligent e-learning system designed for Sri Lankan children aged 4 to 6. The platform integrates gamification, affordances, constructivist learning approaches, and mood recognition to foster a captivating and adaptive educational experience. To the best of knowledge, Punchi Panchi is the first Sinhala-language educational platform to integrate these features for early learners in Sri Lanka. It offers both cultural relevance and educational innovation. The system provides continuous voice guidance throughout interactive game-based learning activities, making it easier for young learners to navigate independently. The research methodology involved 40 kindergarten children using a stratified random sampling technique. The engagement and learning outcomes were compared between those using the platform with full features (gamification, constructivist learning, affordance, and mood recognition) and those using traditional learning methods. The average Normalized Gain (g) score for the platform; 0.72, is significantly higher than the traditional group's 0.46. The average usability score of the platform is 81.25, which exceeds the industry benchmark of 68. The observed engagement level was consistently high among platform users. The research determined that the playful and interactive learning platform, Punchi Panchi, provides significant educational benefits to young children. It helps build confidence by creating a mistake-friendly environment. The platform promotes self-directed exploration and problem-solving. It allows children to take an active role in their educational progression. Overall, Punchi Panchi improves both engagement and learning effectiveness, turning into a valuable tool for early childhood education.

Keywords: *Gamification, Constructivist learning, Affordances, Mood recognition, Kindergarten*

CogniX: Constructive learning with an AI-based web App for open-ended question support

K. N. S. Dissanayake, S. A. E. P. Perera, B. P. Thewahettige, J. M. C. M. Bandara

*Department of Information and Communication Technology, Faculty of Technology,
University of Colombo, Sri Lanka*

CogniX is an artificial intelligence-powered web application designed to enhance university students' ability to answer open-ended questions effectively. Open-ended questions are crucial for developing critical thinking and analytical skills; however, many students struggle to provide responses that meet examiner expectations, particularly under exam stress and time constraints. This challenge significantly impacts academic performance and the development of essential skills including analysis, communication, and thought organization. This research addresses these challenges through a comprehensive AI-powered web application that provides real time, personalized feedback to improve students' open-ended question responses. The primary objective is to develop a system that enhances response quality by fostering critical thinking, aligning answers with exam standards, and promoting self-directed learning to ultimately improve academic performance. Unlike conventional AI chatbots that rely on single language models, CogniX uses a multi-agent AI system combining Chain of Thought, RAG, and self-reflection for smarter, context-aware reasoning. These agents collaboratively extract relevant data from uploaded notes, store information in a Chroma DB vector database, process questions and answers from PDF documents, generate contextually appropriate responses using provided materials, evaluate student answers, and deliver constructive feedback based on individual responses. CogniX's feedback closely aligns with that of human educators and also can see an improvement in student answer quality after using the system. Based on the feedback survey conducted using 30 university students and model comparisons, 93% of respondents agreed that CogniX accurately identified their weak points and provided clear, constructive suggestions. Additionally, CogniX demonstrated significantly higher performance when compared to single-model systems. CogniX not only addresses the gap in automated answer evaluation but also opens new opportunities for intelligent tutoring applications in educational environments, especially where human resources are limited. Future developments will incorporate more sophisticated AI agents, integrate Sinhala language support, and extend functionality to O/L and A/L ICT students.

Keywords: *Agentic flow, Vector database, LLM, Personalized feedback, RAG*

AI-powered home workout assistant: Real-time pose estimation and repetition counting for exercises

P. T. G. S. S. Premachandra, H. M. S. D. Yapa, S. T. T. Samarasinghe, C. K. Samarasekara

*Department of Information and Communication Technology, Faculty of Technology,
University of Colombo, Sri Lanka*

Correct exercise posture is crucial for achieving maximum workout effectiveness and injury prevention. On the other hand, most people do not have access to professional physical trainers who can give them real-time guidance and supervision. This research study suggests an intelligent exercise assistant app that implements a camera-based method to recognize human poses while exercising. This system utilizes Google's MoveNet pose estimation model to locate 17 key points of the user in real time. A sequence-based LSTM classification model is then used to interpret these key points and to decide which exercise has been performed and if it is executed correctly or not. Depending on the classification, the program will give the user, possible actions to fix the mistake in the posture and form. The dataset for training purposes contains key point sequences taken from workout videos that are labeled with correct and incorrect postures. Experimental findings show that this developed AI based system can correctly identify various types of exercises and also recognize the incorrect poses without any extra sensors. This low-cost AI-powered virtual coaching tool can be accessed on smartphones and is therefore more accessible and scalable. This research indicates the opportunity of utilizing real-time pose estimation and deep learning in combination, to enable fitness training that is safe and more efficient for those without professional supervision.

Keywords: *Exercise, AI, Pose estimation, Fitness technology, Repetition counting*

Athuru Mithuru: A comprehensive digital platform for predicting learning disorders in children

G. B. C. Jayalath, N. G. D. V. Nirmani, L. I. Kariyawasam, J. M. C. M. Bandara

*Department of Information and Communication Technology, Faculty of Technology,
University of Colombo, Sri Lanka*

Early detection of learning disorders in children is critical, yet traditional assessment methods are often time-consuming, lack child engagement and scalability, particularly in low-resource settings like Sri Lanka. To address this gap, 'Athuru Mithuru,' a comprehensive Sinhala-language digital platform, is introduced to predict four key learning disorders: Dyspraxia, Dyscalculia, Dysgraphia, and Dyslexia—in children aged seven to ten. This platform combines Sinhala language content, game-based assessments and real time behavioral analysis to create a child-friendly and accessible alternative to traditional diagnosis methods. This web application was built using React and Tailwind CSS for responsive design and Firebase for secure data handling. 'Athuru Mithuru' integrates space-themed environment and interactive games that record gameplay metrics including accuracy, response time and mouse activity. A machine learning model process handwriting samples captured via webcam to assist in Dysgraphia prediction. The platform analyzes collected data to generate confidence-based disorder predictions. These results are delivered to teachers and parents through detailed reports. Initial usability evaluations revealed high engagement among children and ease of use for non-technical users. The System Usability Scale (SUS) score was well above the average benchmark of 68, indicating strong usability and positive user experience across both children and teachers. Technically, the system ensures cross-platform performance. The machine learning model used for handwriting analysis was evaluated using the F1 score to confirm its predictive accuracy. As an additional outcome, this system contributes to future academic research by generating new, publicly shareable datasets for underrepresented disorders such as Dyslexia, Dyspraxia, and Dyscalculia. By combining localized language support, machine learning and child-centric design, 'Athuru Mithuru' demonstrates a successful model for accessible, accurate and scalable early learning disorder prediction, paving the way for timely interventions in Sri Lankan classrooms and beyond.

Keywords: *Learning disorders, Early detection, Machine learning, Sinhala web application, Children*

Cinnamon Care: A novel deep learning enabled cinnamon diseases identification platform

U. A. S. Tharaka, H. M. J. Wathsala, N. N. Thilakarathne

*Department of Information and Communication Technology, Faculty of Technology,
University of Colombo, Sri Lanka*

This study presents the design, development, and evaluation of a mobile-based cinnamon disease identification platform to support cinnamon farmers by early detection of several diseases affecting the cinnamon crop using deep learning. Cinnamon, a major agricultural export crop in Sri Lanka, is highly susceptible to several leaf and stem diseases that can significantly reduce quality and yield. Several systems have already been introduced to identify some of these diseases. However, a specific system that identifies three main diseases and provides recommendations for their treatment is not available. To address these challenges, this study introduces an AI-driven solution powered by a Convolutional Neural Network (CNN) deployed through a Flutter mobile application. The system integrates a transfer learning-based CNN model hosted on Microsoft Azure, with Firebase used for image storage and real-time data exchange. The Flutter application allows users to upload images of affected leaves and stems, which are then sent to the cloud-based model through Firebase for prediction. The model returns disease classification results, which are stored in Firebase Firestore, and displayed to the user along with historical records. Deployment is managed using GitHub Actions for consistent updates. Experimental results show that the MobileNetV2 model has an impressive accuracy of 90.76% and effective performance in real-time disease prediction. The average prediction response time is minimal, and the system ensures user-friendly access, even on basic smartphone. Further research and development, expanding the dataset using real-world field imagery and integrating emerging technologies with the system, can increase the accuracy of the system, thereby contributing to the growth and sustainability of the cinnamon cultivation export industry.

Keywords: *Cinnamon disease, Deep learning, CNN, MobileNetV2, Transfer learning*

Enhanced salary prediction in data science industry: Integrating economic indicators with XGBoost regression

W. G. J. S. Wimalasena, A. G. L. Lakshitha, C. K. Samarasekara

*Department of Information and Communication Technology, Faculty of Technology,
University of Colombo, Sri Lanka*

Precise salary prediction is essential for addressing job market uncertainties and promoting fair compensation policies across industries. This study uses XGBoost regression algorithm to examine if integrating macroeconomic information improves the accuracy of salary predictions in the data science sector. The study integrates demographic and professional experience data through four years of historical salary information from Kaggle.com which was scraped from Glassdoor and focuses specifically on US data science positions. The dataset underwent comprehensive feature engineering to optimize predictive capabilities. The enhanced XGBoost model integrates GDP growth rate, inflation rate, unemployment rate and interest rate as further predictive characteristics. According to the study, there is a significant increase in prediction accuracy; the improved model's Mean Absolute Error (MAE) of 5021 is 86.6% better than the baseline XGBoost model's MAE of 37554. The model provides forecasting capabilities for upcoming years by effectively capturing salary variances across different job titles, employment categories, and experience levels. The application of macroeconomic indicators demonstrates how economic circumstances have a significant effect on data science compensation systems. The model demonstrates that economic factors such as GDP growth rate, inflation rate, unemployment rate, and interest rate substantially impact salary determination, providing a more comprehensive understanding of compensation dynamics. A Flutter mobile application built around this machine learning model was developed for better practical applicability. It allows users to see income progression charts across several chosen parameters and forecast earnings for the coming years. This study helps job seekers make career decisions and offers HR professionals insightful information for strategic compensation planning. The research improves decision-making skills by providing a trustworthy instrument for assessing earning potential. The results demonstrate that salary prediction models are significantly improved by macroeconomic integration.

Keywords: *Machine learning, XGBoost, Salary prediction, GDP growth rate, Inflation rate*

Cloud Era: An AI-driven multilingual chatbot for intelligent multi-cloud resource guidance

P. M. Kandamby, V. P. Wattegedara, N. N. Thilakarathne

*Department of Information and Communication Technology, Faculty of Technology,
University of Colombo, Sri Lanka*

Managing multi-cloud setups can feel overwhelming, with tangled configurations, scattered docs, and little multilingual support. Standard Retrieval-Augmented Generation (RAG) tools often miss personal touches and connections, making them less helpful. In this regard, this research proposed Cloud Era, an AI-powered chatbot that delivers smart, tailored advice for handling cloud resources. Our goals were to achieve over 80% troubleshooting and setup success compared to basic RAG, boost recall by more than 40% with mixed retrieval, and cut hallucinations by over 70% using agentic flows, all while supporting English and Sinhala. Built on an Agentic RAG framework inspired by LightRAG, it blends semantic vector searches with dynamic knowledge graphs for better precision than simple RAG. Each agent step—clarifying domains, refining and breaking down questions, reevaluating, checking web relevance via LLM, and reranking—runs through LLM API calls. Validation used an LLM-as-judge approach, comparing generated responses with expert answers to measure accuracy. The setup ran locally on a basic GPT model, with prompts tied to source data, providing detailed explanations and resource links. Testing with 10 users showed 87% satisfaction. For multilingual checks, 120 queries across English, Sinhala, and mixed languages confirmed strong retrieval, including 81% recall for Sinhala. Compared to traditional RAG, our graph-RAG hybrid excelled. Local hosting keeps it quick and accessible, though multi-step reasoning can still cause slips, partly eased by intent checks and hybrid pulls. In sum, Cloud Era advances multi-cloud help by weaving agentic RAG, hybrid retrieval, and inclusivity, bringing clear wins for diverse users. Drawbacks include reliance on quality data and limited real-time API ties, while future work aims to add languages and sharpen reasoning.

Keywords: *Agentic RAG, Hybrid retrieval, Knowledge graphs, AI chatbot, Multilingual support*

Tea Guardian: A novel hybrid deep learning-driven approach for tea leaf disease detection and treatment recommendation

P. D. U. I. Pushpakumara, B. A. U. L. Bamunusinhe, W. D. G. M. Wijesinha,
N. N. Thilakarathne

*Department of Information and Communication Technology, Faculty of Technology,
University of Colombo, Sri Lanka*

This study was conducted to assist Sri Lankan tea farmers in managing common leaf diseases, including algal leaf spot, brown blight, and gray blight. These diseases significantly damage crop quality and reduce profitability. Most farmers currently rely on visual inspection and expert knowledge for disease identification, which can result in delays and incorrect treatments. Tea Guardian, a mobile application, was developed to enable farmers to rapidly detect tea leaf diseases and receive treatment recommendations. The system combines two deep learning models convolutional neural networks (CNN) and vision transformers (ViT) to analyze leaf images. This hybrid approach achieved superior results compared to individual models. Due to the computationally intensive nature of the model, the application operates entirely online via a cloud platform, enabling scalable and maintainable processing without relying on mobile device capabilities. The dataset comprised publicly available datasets combined with locally collected Sri Lankan tea leaf images. Preprocessing steps included noise removal, color adjustment, and data augmentation to enhance robustness, while training and testing followed standard dataset splits to ensure reliable evaluation. Our proposed hybrid model achieved 92.57% accuracy, outperforming previous studies. For comparison, traditional CNN models achieved 85.2% – 89.1%, GoogleNet+ approximately 80%, YOLOv5+ around 70%, and ViT vs CNN approximately 87%. The superior performance is attributed to the combination of CNN's local feature extraction capabilities and ViT's long-range dependency modeling, providing comprehensive disease detection representation. The application provides treatment recommendations using both organic and chemical methods to promote environmentally sustainable farming practices. An integrated chatbot offers general tea farming guidance, including best practices and nutrient management advice. Initial usability testing with farmers confirmed the application's accessibility and ease of use, even among users with limited technical expertise. Tea Guardian represents a significant advancement in smart farming technology, presenting a scalable solution for enhancing tea cultivation in Sri Lanka and other tropical regions.

Keywords: *Tea leaf disease, Deep learning, CNN-ViT hybrid model, Mobile application, Precision agriculture*

TagCly - predictive pet health management system using smart collar

K. Mirojan¹, S. Tharshan¹, S. Krishan¹, D. M. D. Dissanayaka², N. T. Weerawarna¹

¹*Department of Information and Communication Technology, Faculty of Technology,
University of Colombo, Sri Lanka*

²*DMS Electronics (Pvt) Ltd, Sri Lanka*

The increasing presence of pets has created a need for proactive animal health management. Existing care practices are reactive, and, in many cases, making the treatment of health problems more expensive and a burden to the owner. Wearable pet technology aims at basic tracking and lacks abilities for forecasting. The proposed “TagCly” research is an Internet of Things (IoT) system that incorporates Machine Learning (ML) to ensure the health condition prediction of pets and alert the owner. “TagCly” has a microcontroller onboard with sensors for tracking temperature, movement, and a gyroscope module with location data tracking and heart rate with vocalization. Sensor data is sent via MQTT over Wi-Fi, with local buffering for disconnections; future upgrades include BLE and cellular for extended connectivity. This data is sent in real-time to the backend to be analysed and have an ML inference. Health analytics use Python-based ML models: Random Forests, regression, clustering, and anomaly detection. The anomaly detection performed with MERN-stack interface (MongoDB, Express.js, React.js, Node.js) provides an intuitive view, real-time analytics, and predictive warnings to dog owners. Testing was conducted using a synthetic dataset of over 8,000 samples, generated to simulate sensor readings and engineered features. TagCly achieved 89% accuracy in predicting behaviors and anomalies, and 92% accuracy in action reporting such as step-counting. Implementing predictive wearables for pets is an optimal practice for the preventive care of pets. The future research opportunities span from experimenting with the smart collar with different types of pets, ergonomics of wearable and improving the pet tracking area. “TagCly” will make pet care proactive, assist in promptly intervening with pets, reduce the expense of veterinary care, and empower pet owners with timely and action-based pet health initiatives.

Keywords: *Smart pet collar, IoT, Machine learning, Predictive health*

AgroStock: A location-based decision AI predictive platform for agricultural trade and inventory optimization in Sri Lanka

A. M. K. C. Wijebandara, S. L. Vithana, A. K. K. A. Hemachandra, N. T. Weerawarna

*Department of Information and Communication Technology, Faculty of Technology,
University of Colombo, Sri Lanka*

The agricultural industry in Sri Lanka experiences devastating post-harvest losses, causing 30%-40% annual loss, particularly affecting smallholder farmers with limited market access and inadequate demand forecasting capabilities. The research objectives were to develop a comprehensive location-based AI predictive platform that reduces post-harvest wastage by 20% while improving farmer profitability through integrated digital solutions, establish direct market connectivity, eliminate intermediary dependencies, and create secondary market mechanisms for surplus produce management following circular economy principles. This investigation reveals how traditional supply chains create substantial information asymmetries through heavy reliance on intermediary networks. The "AgroStock" platform introduces a web-based, location-aware AI solution that combines GPS-enabled tracking with hybrid AI models trained on local market data to predict weekly demand for carrots, pumpkins, onions, and tomatoes. The methodology integrates participatory design with system development and field observations utilizing stakeholder interviews, surveys, and market data analysis from the Veyangoda Economic Centre. The solution merges ARIMA statistical analytics (30%) with Gemini AI predictive analytics (70%) through a weighted ensemble approach, achieving superior forecasting accuracy. Individual model performance shows ARIMA at 96.80% and Gemini AI at 98.33%, while the combined approach demonstrates 99.14% accuracy with a Mean Absolute Percentage Error of 0.861%, representing 66.6% improvement over the individual models. The platform enables informed production decisions through location-based supply pattern analysis and facilitates direct farmer-buyer connections via real-time inventory management. Field validation demonstrates measurable economic impact with projected 15% farmer profit margin improvements and 25% inventory turnover enhancement. The secondary market mechanism redirects 60-80% of surplus production to food processors, compost makers, and animal feed suppliers, promoting circular economic principles. This opens opportunities for future researchers to feed data and test this approach for other crops in Sri Lankan agriculture. This scalable digital solution addresses critical supply chain gaps, contributing to sustainable development through systematic waste reduction and enhanced market connectivity.

Keywords: *AgriTech AI, Predictive analysis, Post-harvest loss, Digital marketplace, Supply chain optimization*

FACULTY OF NURSING



AI in Healthcare: Advancing Patient Care and Evidence-Based Practice

29th October 2025

MESSAGE FROM THE DEAN

Professor S. S. P. Warnakulasuriya

*Faculty of Nursing
University of Colombo
Sri Lanka*



It is my great pleasure to address the 4th International Nursing Conference, 2025, organized by the Faculty of Nursing, University of Colombo, Sri Lanka, under the theme “AI in Healthcare: Advancing Patient Care and Evidence-Based Practice.” This annual event has become a cornerstone of our academic calendar, consistently showcasing high-quality research by academics, undergraduates, and scientists.

This year’s symposium is particularly significant as it aligns with the global shift towards advanced patient care and evidence-based practice enhanced by AI in healthcare. It also marks the presentation of research projects by our recent nursing graduates. Furthermore, this year’s conference is especially meaningful as, for the first time, we are introducing an oration to our annual research conference. I strongly believe this symposium will be a great success, as we have organized two technical sessions, with more opportunities for scientific dialogue expected to take place. The proceedings include 15 research abstracts, thoroughly reviewed and assessed by a panel of academics to ensure quality. I extend my sincere gratitude to the organizing committee, led by Dr. Thilina Gunathilaka, for their dedication and hard work. I also thank the Heads of Departments, academic staff, Senior Assistant Registrar, and non-academic staff for their unwavering support. I congratulate all the presenters for contributing their research to this conference.

My special appreciation goes to Dr. Kaneeka Vidanage, Senior Lecturer and Head of the Department of Computer Science, General Sir John Kotelawala Defence University, for delivering the Keynote Address, as well as to all the plenary speakers of the 4th International Nursing Conference. I would also like to place on record my heartfelt thanks to Professor Indika Mahesh Karunathilake, Vice-Chancellor of the University of Colombo, for his moral support, visionary leadership, guidance, and inspiration in the recent past, which have contributed greatly to the development and smooth functioning of the Faculty of Nursing.

I warmly welcome all participants and hope you will enjoy the scholarly richness and vibrant atmosphere of the 4th International Nursing Conference, Faculty of Nursing, University of Colombo. I wish the 4th International Nursing Conference 2025 great success!

MESSAGE FROM THE SYMPOSIUM CHAIR

Dr. Thilina Lakmini Gunathilaka

*Department of Basic Science and Social Science for Nursing
Faculty of Nursing
University of Colombo
Sri Lanka*



It is with great pleasure that I welcome you to the 4th International Nursing Conference 2025, held under the theme "AI in Healthcare: Advancing Patient Care and Evidence-Based Practice." This theme reflects our shared commitment to exploring how artificial intelligence is revolutionizing nursing practice, enhancing clinical decision-making, and strengthening the foundation of evidence-based care.

We are proud to open this year's conference with a Preconference Workshop titled "AI for Academic Research and Publications." This interactive session is designed to empower researchers and students with practical knowledge on how AI can support literature reviews, data analysis, manuscript writing, and scholarly dissemination tools that are increasingly essential in today's academic landscape.

I would also like to take this opportunity to extend my sincere appreciation to our sponsors and the organizing committee for their dedication and hard work in making this event a reality. Their unwavering support has been instrumental in creating a platform for meaningful exchange and professional growth.

A special thanks goes to Dr. Kaneeka Vidanage, Senior Lecturer and Head of the Department of Computer Science, Faculty of Computing at General Sir John Kotelawala Defence University, for delivering the Keynote Address. We are honoured by his presence and the insights he brings into the integration of AI within healthcare systems. I also extend my gratitude to all our invited speakers for their valuable contributions to this conference.

We are confident that INC 2025 will offer a professionally enriching and memorable experience for all participants. Let us embrace the future of nursing by advancing patient care through the thoughtful integration of artificial intelligence and evidence-based practice.

ORGANIZING COMMITTEE

Symposium Chair	Dr. M. D. Thilina Lakmini Gunathilaka (Senior Lecturer, Department of Basic Sciences and Social Sciences for Nursing)
Secretary	Mrs. M. W. Nilushi Nisansala (Senior Lecturer, Department of Fundamental Nursing)
Co-Secretaries	Prof. A. S. Elvitigala (Professor in Basic Sciences, Department of Basic Sciences and Social Sciences for Nursing) Mrs. N. C. Sepala (Lecturer, Department of Clinical Nursing) Mrs. R. A. N. D. Ranaweera (Lecturer (Probationary), Department of Fundamental Nursing) Mr. D. K. M. De Silva (Lecturer (Probationary), Department of Clinical Nursing)
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SYMPOSIUM PROGRAMME

8.00 am – 8.30 am	Registration of Participants
8.30 am – 8.40 am	Inauguration of the 4th International Nursing Conference 2025 Lighting of the Traditional Oil Lamp
8.40 am – 8.50 am	Traditional Cultural Dance
8.50 am – 9.00 am	Welcome Address <i>Dr. M. D. T. L. Gunathilaka</i> <i>Chairperson, 4th International Nursing Conference, 2025</i>
9.00 am – 9.10 am	Citation of the Orator <i>Prof. Anushka Elvitigala</i>
9.10 am – 9.40 am	Oration <i>Prof. S. S. P. Warnakulasuriya</i>
9.40 am – 9.50 am	Introduction to the Chief Guest <i>Dean – Faculty of Nursing</i>
9.50 am – 10.20 am	Address by the Chief Guest <i>Prof. Indika Mahesh Karunathilake</i> <i>Vice-Chancellor, University of Colombo</i>
10.20 am – 10.40 am	Refreshments
10.40 am – 10.50 am	Introduction to the Keynote Speaker <i>Dr. M. D. T. L. Gunathilaka</i> <i>Chairperson, 4th International Nursing Conference</i>
10.50 am – 11.30 am	Keynote Address <i>Dr. Kaneeka Vidanage</i> <i>Senior Lecturer, General Sir John Kotelawala Defence University</i>
11.30 am – 11.40 am	Vote of Thanks <i>Ms. Nilushi Nisansala</i> <i>Secretary, 4th International Nursing Conference 2025</i>
11.40 am – 11.45 am	Introduction to Plenary Speaker <i>Ms. Nadini Ranaweera</i> <i>Co-Secretary, 4th International Nursing Conference 2025</i>
11.45 am – 12.15 pm	Plenary Address <i>Prof. K. P. Hewagamage</i> <i>University of Colombo School of Computing</i>
12.15 pm – 1.00 pm	Lunch
1.00 pm onwards	Technical Sessions
3.30 pm – 4.00 pm	Awarding of Certificates for the Presenters and Closing Remarks

INTRODUCTION TO THE KEYNOTE SPEAKER

Dr. Kaneeka Vidanage

*Head, Department of Computer Science
Faculty of Computing
General Sir John Kotelawala Defence University
Sri Lanka*



Dr. Kaneeka Vidanage is a Senior Lecturer and the Head of the Department of Computer Science, Faculty of Computing at General Sir John Kotelawala Defence University, Sri Lanka. His academic specialization is in Artificial Intelligence and Healthcare Integration, with a research focus on applying intelligent systems to improve clinical workflows and patient care.

Dr. Vidanage earned his PhD in Ontological Modelling for intelligent computerized clinical workflow management from Universiti Malaysia Terengganu, where his work was recognized with several international research awards and intellectual property rights granted by the Malaysian Intellectual Property Organization (MyIPO). He also completed an M.Phil. in Artificial Intelligence and psychological process governance and an M.Sc. in Information Technology at the University of Colombo, along with a B.Sc. in Computing with a second class upper from the National University of Ireland.

A professional member of the British Computer Society, Dr. Vidanage has established strong international research collaborations with partners in Malaysia and New Zealand. His scholarly work has been published in numerous high-ranked journals and has already attracted close to 200 citations, reflecting the global impact of his research.

With his expertise at the intersection of AI, healthcare, and knowledge systems, Dr. Vidanage continues to advance innovative, human-centered solutions while inspiring the next generation of researchers and practitioners in the field of computing.

ABSTRACT OF THE KEYNOTE ADDRESS

Artificial Intelligence in Nursing – Technologies, Applications, Emerging Trends and Challenges

Dr. Kaneeka Vidanage

Department of Computer Science

Faculty of Computing

General Sir John Kotelawala Defence University, Sri Lanka

Artificial Intelligence (AI) is no longer a distant promise but a powerful reality reshaping healthcare. At the heart of this transformation lies the nursing profession - an indispensable pillar of patient care—where AI has the potential to empower professionals, enrich decision-making, and elevate service standards. Recent advancements in machine learning, natural language processing, and robotics are beginning to redefine how nurses support clinical decision-making, monitor patients, optimize workflows, and share knowledge. These technologies, when harnessed responsibly, can free up valuable time for compassionate caregiving, the true essence of nursing. Yet, the road ahead is not without challenges. Issues of ethics, privacy, algorithmic bias, and explainability demand thoughtful engagement and collaboration between nursing professionals and technology experts. A rationalized decision-making framework is essential to guide non-technical stakeholders in aligning AI solutions with the real needs of nursing practice. By striking the right balance between innovation and responsibility, AI can serve not as a replacement, but as a powerful ally, enabling nurses to deliver care with greater precision, humanity, and impact.

LIST OF ABSTRACTS

The intention of migration and associated factors among nursing undergraduates of selected state universities in Sri Lanka <i>D. K. M. De Silva, H. M. C. M. Herath, N. C. Sepala, U. G. N. Priyadarshani, D. M. O. T. K. Bandara, N. Rathnayake, S. S. P. Warnakulasuriya</i>	393
Prevalence of undernutrition and associated factors among pregnant women in the first trimester in Colombo District, Sri Lanka <i>L. H. D. D. Jayasooriya, U. H. T. Uthpala, H. S. P. F. Fernando, A. M. M. Afridi, N. M. I. Nawanjana, R. D. S. G. Rajamuni, D. K. M. De Silva, H. M. C. M. Herath</i>	394
Relationship between attitudes and practices of nurses towards intestinal stoma care in surgical units of selected tertiary care hospitals in the Western Province, Sri Lanka <i>U. H. T. Uthpala, D. K. M. De Silva, T. A. Asuakkody</i>	395
Factors affecting knowledge and practices among public transport drivers on pre-hospital handling of spinal cord injury victims in Colombo District, Sri Lanka <i>A. S. K. Perera, L. M. T. M. Demel, K. S. D. A. Gunawardhana, K. L. A. T. Madhushika, D. M. Senarath, W. A. Madushika, W. M. D. D. Wickramasinghe, W. A. R. P. Menike</i>	396
Psychological, lifestyle and physiological factors affecting health-related quality of life among stroke patients in selected teaching hospitals in Western Province, Sri Lanka <i>H. M. C. R. Herath, A. S. Mahadanarachchi, S. B. H. Sudeshika, L. D. R. Perera, E. A. H. U. Dharmarathne, K. A. I. L. Kuruppu, U. G. N. P. Uyanwaththa, R. A. N. D. Ranaweera, T. A. Asurakkody</i>	397
Attitude, practices, and associated factors towards self-care for chemotherapy side effects among cancer patients at Apeksha Hospital, Sri Lanka <i>L. L. N. T. Alwis, G. V. M. N. Karunarathne, K. S. Nimasha, K. M. Gampalage, L. S. Ruhunage, H. V. D. B. Vidanage, K. Nilmini, M. M. G. C. Mahanama, M. G. S. Nishara, M. G. A. S. Malkanthie</i>	398
Knowledge on insulin self-administration, its adherence and associated factors among patients with diabetes mellitus attending diabetic clinics at selected teaching hospitals in Colombo District, Sri Lanka <i>S. Sangavi, W. A. D. Gunasekara, K. G. D. Darshana, H. W. P. M. Kumari, P. D. T. Nuwandhara, K. P. R. T. Wijerathne, K. M. N. Damayanthi, D. M. O. T. K. Bandara, G. Kisokanth</i>	399
Genetics-related knowledge, attitudes, and readiness for practice among final-year diploma nursing students in Western Province, Sri Lanka <i>A. R. M. C. A. K. Alawathupitiya, P. W. G. A. V. Jayathilaka, W. V. H. Veenavi, M. J. Nawodya, R. M. N. M. Rathnayaka, T. M. H. Fernando, M. E. I. Sumuduni, S. K. A. M. S. Samarasinghe, H. S. Senarathne, D. A. S. Elvitigala</i>	400

Awareness, satisfaction, and associated factors of preoperative nursing care among adults undergoing major surgery in selected government teaching hospitals, Colombo District, Sri Lanka	
<i>K. N. Thalgaspitiya, S. U. Malalagama, N. W. K. P. M. Perera, H. M. M. S. L. Herath, K. B. Y. P. Dharmasena, M. L. D. D. De Costha, S. A. L. Chathurangika, N. P. Edirisinghe ...</i>	401
Readiness for technology usage and its associated factors among selected peri-urban diabetic population in Colombo District, Sri Lanka	
<i>M. C. Nimasha, S. P. G. D. H. Karunasinghe, W. A. S. D. Wanigasundara, S. Gobika, A. M. S. N. Attanayaka, P. Sajinth, M. S. Abeywickrama, N. Siribaddhana, M. W. N. Nisansala</i>	402
Prevalence and associated factors of poor sleep quality among nursing undergraduates in state universities, Sri Lanka	
<i>W. A. S. C. Jayarathna, S. Mithurja, M. R. Pramodya, E. M. M. B. U. B. Ekanayake, H. M. Tharik, M. A. L. Udayanganee, P. H. W. S. Dharmawardana, M. D. T. L. Gunathilaka</i>	403
Level of cognitive function and associated factors among community-dwelling older adults in a semi-urban area in Colombo District, Sri Lanka	
<i>H. W. I. Kavindya, D. G. I. Chathumini, K. Nithusha, G. T. M. Gunarathna, K. K. P. M. Samaranayaka, M. T. S. D. Weerathunga, U. L. P. S. Kalpani, U. G. N. Priyadarshani, S. S. P. Warnakulasuriya</i>	404
Adoption of artificial intelligence in selected nursing schools: A study on higher education in nursing in the Western Province of Sri Lanka	
<i>S. M. S. Ratnayake, T. A. Ratnayake, R. D. Wikramaarachchi</i>	405
Trends in hospitalized myocardial infarction incidence in Sri Lanka: A retrospective study	
<i>D. K. M. De Silva, L. M. U. L. Lewliyadda, D. M. O. T. K. Bandara, M. W. N. Nisansala, M. G. S. Nishara, W. M. D. D. S. Ranasinghe, S. D. Dharmaratne, S. S. P. Warnakulasuriya</i>	406
Knowledge, attitudes and practices related to syphilis among undergraduates of University of Colombo, Sri Lanka	
<i>D. M. I. D. Kumara, M. S. M. Yoosuf, P. Sankeethan, M. A. A. De Costa, W. N. M. L. H. R. Gunathilaka, W. T. P. Hansika, A. D. K. Pieris, B. Ranjani, T. S. Amarasinghe, D. L. N. L. Ubhayawardana</i>	407

The intention of migration and associated factors among nursing undergraduates of selected state universities in Sri Lanka

D. K. M. De Silva¹, H. M. C. M. Herath², N. C. Sepala², U. G. N. Priyadarshani²,
D. M. O. T. K. Bandara¹, N. Rathnayake³, S. S. P. Warnakulasuriya²

¹*Faculty of Nursing, University of Colombo, Sri Lanka*

²*Department of Clinical Nursing, Faculty of Nursing, University of Colombo, Sri Lanka*

³*Department of Nursing, Faculty of Allied Health Sciences, University of Ruhuna, Sri Lanka*

Migration for better career opportunities and quality of life is a global trend. Due to the increasing demand for nurses in developed countries, Sri Lankan nursing undergraduates seek professional and personal growth abroad, driven by challenges in their home-country, such as limited career advancement and low salaries. The objective of this study was to identify the intention of migration (ITM) and its associated factors among nursing undergraduates in selected state universities in Sri Lanka. A descriptive cross-sectional study was conducted at two state universities in the Western and Southern Provinces of Sri Lanka. A total of 384 nursing undergraduates were selected through stratified random sampling. A validated, pre-tested, self-administered questionnaire adapted from a previous study was used to measure ITM using five statements on a 5-point Likert scale. Data were analyzed using SPSS v.26. ITM was categorized into “high” and “low” based on the median score cutoff value. The chi-square test was used to identify the associations between ITM levels and associated factors. Ethical approval was obtained from the Ethics Review Committee of the Faculty of Arts, University of Colombo. In total, 300 (78.12%) participants responded. Nearly half (52%) of nursing undergraduates had a high ITM, with Australia being the most preferred destination (n=201), followed by the UK (n=187) and Canada (n=151). Factors influencing ITM included gender, marital status, birth location, family economy, overseas experiences, having relatives/friends abroad, and future career plans ($p<0.05$). Females, urban undergraduates, and undergraduates from higher socio-economic backgrounds were more likely to express a higher ITM. A considerable proportion of nursing undergraduates have a high ITM, and the complex interplay of socio-economic and personal factors influences ITM. Marital status, birth location, family economy, overseas experiences, having relatives/friends abroad, and future career plans were the major determinants of ITM. Government policies need to be established to facilitate ethical migration by balancing the positive and negative impacts of nurses’ migration to the country.

Keywords: *Associations of migration, Intention of migration, Nursing undergraduates, Sri Lanka*

Prevalence of undernutrition and associated factors among pregnant women in the first trimester in Colombo District, Sri Lanka

L. H. D. D. Jayasooriya¹, U. H. T. Uthpala¹, H. S. P. F. Fernando¹, A. M. M. Afridi¹,
N. M. I. Nawanjana¹, R. D. S. G. Rajamuni¹, D. K. M. De Silva², H. M. C. M. Herath²

¹*Faculty of Nursing, University of Colombo, Sri Lanka*

²*Department of Clinical Nursing, Faculty of Nursing, University of Colombo, Sri Lanka*

Undernutrition during pregnancy remains a critical public health concern, particularly in low and middle-income countries, including Sri Lanka, where it contributes to poor maternal and neonatal outcomes. Identifying nutritional status early in pregnancy is crucial for timely intervention and improving maternal and fetal health. The objective of this study was to assess the prevalence of undernutrition and determine associated socio-demographic and pregnancy-related factors among pregnant women in the first trimester in Colombo District, Sri Lanka. A descriptive cross-sectional study was conducted among 422 pregnant women in the first trimester attending antenatal clinics in four purposively selected Medical Officer of Health (MOH) areas within the Colombo District. Participants were selected using a stratified random sampling technique. Undernutrition was assessed using standard mid-upper arm circumference, which was less than 23 cm. Data were collected through a validated questionnaire that consisted of demographics, pregnancy-related, and anthropometric data. Descriptive statistics were used for frequency and percentage distribution, while chi-square tests identified significant associations between undernutrition and various factors. Statistical significance was set at $p < 0.05$. A total of 380 participants responded. Of these 243 (63.9%) were aged >30 years. Among the participants, 32.9% ($n=125$) were identified as undernourished. Undernutrition was significantly associated with maternal age ($p<0.001$), educational attainment ($p<0.001$), marital status ($p<0.001$), unplanned pregnancies ($p=0.002$), absence of regular antenatal follow-up ($p=0.025$), and inadequate rest ($p<0.001$). Socioeconomic factors such as occupation type ($p<0.001$) also showed significant associations, whereas monthly income did not demonstrate a strong link ($p=0.250$). A considerable proportion of pregnant women in Colombo experiences undernutrition. Strengthening the interventions targeting young, less-educated, unemployed, and unmarried mothers, particularly those with unplanned pregnancies and irregular antenatal visits, is essential though further analysis is required to confirm independent predictors of undernutrition.

Keywords: *Antenatal care, Maternal health, Nutritional status, Undernutrition*

Relationship between attitudes and practices of nurses towards intestinal stoma care in surgical units of selected tertiary care hospitals in the Western Province, Sri Lanka

U. H. T. Uthpala¹, D. K. M. De Silva², T. A. Asuakkody³

¹*Faculty of Nursing, University of Colombo, Sri Lanka*

²*Department of Clinical Nursing, Faculty of Nursing, University of Colombo, Sri Lanka*

³*Department of Fundamentals of Nursing, Faculty of Nursing, University of Colombo, Sri Lanka*

Intestinal stoma care is a critical aspect of practice in surgical units, where patients often require postoperative management, especially for novel stomas. Nurses' attitudes toward stoma care can directly influence the quality of patient management. Despite this, the relationship and the impact of this relationship remain unclear in this area in Sri Lanka. This study aimed to assess the correlation between attitudes and practices of nurses towards intestinal stoma care in surgical units of selected tertiary care hospitals in Western Province in Sri Lanka. A cross-sectional, correlational study was conducted among 422 nurses in surgical wards at three randomly selected tertiary-care hospitals in Western Province. Participants were selected using a simple random sampling method. Data were collected using a self-administered, pretested, and self-developed questionnaire with 0.871 Cronbach's alpha. Data analysis was conducted using SPSS v.26. Descriptive statistics, means, standard deviations, frequencies, and percentages were computed. Pearson's correlation was used to assess the relationships between variables. Ethical approval was obtained from the Ethics Review Committee of the Faculty of Medicine, University of Colombo. Of the 422 nurses approached, 317 responded (75.11%). The mean age was 33.67 ± 8.11 years. Most participants held a diploma in nursing (64.7%) and had 1–10 years of experience (65%). The mean attitude score was 67.96 ± 6.32 , while the mean practice score was 65.83 ± 20.04 . A majority (84.2%) demonstrated a positive attitude, but only 45.7% showed a good level of practice. Pearson's analysis revealed a statistically significant, positive correlation between attitude and practice scores ($r = 0.193$, $p = 0.001$). Although most nurses had positive attitudes, fewer demonstrated good practice. A weak but significant correlation suggests that favorable attitudes modestly influence better practice. Strengthening education, hands-on training, and supportive supervision is crucial to improve both attitudes and competencies in surgical stoma care.

Keywords: *Intestinal stoma care, Nurses' attitudes, Clinical practices, Surgical units*

Factors affecting knowledge and practices among public transport drivers on pre-hospital handling of spinal cord injury victims in Colombo District, Sri Lanka

A. S. K. Perera¹, L. M. T. M. Demel¹, K. S. D. A. Gunawardhana¹, K. L. A. T. Madhushika¹, D. M. Senarath¹, W. A. Madushika¹, W. M. D. D. Wickramasinghe¹, W. A. R. P. Menike²

¹*Faculty of Nursing, University of Colombo, Sri Lanka*

²*Department of Fundamental Nursing, Faculty of Nursing, University of Colombo, Sri Lanka*

Spinal cord injuries (SCI) account for approximately 10% of global deaths annually. SCI has a lower mortality rate, but it often leads to permanent disability. Safe pre-hospital handling and immediate transport to the hospital play a crucial role in minimizing damage from SCI. This study aimed to assess factors affecting knowledge and practices of public transport drivers on safe pre-hospital handling of victims with suspected SCI in selected suburban areas in the Colombo District, Sri Lanka. A descriptive cross-sectional study was conducted in Nugegoda, Dehiwala-Mount Lavinia, and Homagama. Public transport drivers aged 20-60 years, possessing a valid driving license and at least one-year driving experience were recruited through convenience sampling (n=422), proportionally distributed across study areas. Data were collected using a newly developed, pre-tested and validated, interviewer-administered questionnaire comprising four sections including socio-demographics, knowledge (MCQs), attitudes (Likert scale), and practices (binary scale). A 50% threshold, based on prior literature, was used to categorize knowledge and practices. Data were analyzed using SPSS version 26.0. The response rate was 97.6%. The majority (86.9%, n=358) were male while 28.9% (n=119) of participants were in the 52-59 age category. Of the participants 38.6% (n=121) were educated up to O/L. The majority (98.1%, n=404) demonstrated good knowledge (Mean=76.54, SD=11.37), while 55.3% (n=228) had poor practice (Mean=52.72, SD=12.00) regarding pre-hospital handling of SCI. Level of knowledge was significantly associated with education level (p=0.036) and being first aid trained (p<0.001). Level of practice was significantly associated with language (p=0.002), education level (p=0.037), type of employment (p<0.001), and being first aid trained (p<0.001). The level of knowledge was not associated with the level of practice (p=0.129). This study highlights the significant gap between adequate knowledge and poor practice among public transport drivers in SCI handling. Key influencing factors are education, language, employment type, and being first aid trained. Targeted awareness programmes including first aid training should be established.

Keywords: *Knowledge, Practices, Pre-hospital handling, Spinal cord injuries*

Psychological, lifestyle and physiological factors affecting health-related quality of life among stroke patients in selected teaching hospitals in Western Province, Sri Lanka

H. M. C. R. Herath¹, A. S. Mahadanarachchi¹, S. B. H. Sudeshika¹, L. D. R. Perera¹,
E. A. H. U. Dharmarathne¹, K. A. I. L. Kuruppu¹, U. G. N. P. Uyanwaththa¹,
R. A. N. D. Ranaweera², T. A. Asurakkody²

¹*Faculty of Nursing, University of Colombo, Sri Lanka*

²*Department of Fundamentals Nursing, Faculty of Nursing, University of Colombo, Sri Lanka*

Stroke remains a significant global health burden, representing the second leading cause of death and a key contributor to long-term disability. Health-related quality of life (HR-QoL) is a crucial indicator of post-stroke outcomes. The objective of this study was to identify psychological factors, lifestyle and physiological factors that affect Health-Related Quality of Life (QoL) among stroke patients in selected teaching hospitals in the Western Province of Sri Lanka. A descriptive cross-sectional design was utilized for 206 conveniently selected stroke patients from stroke units and neurology clinics in the National Hospital of Sri Lanka and Colombo North Teaching Hospital. Content-validated and interviewer-administered questionnaire with Modified Rankin Scale (mRS; $\alpha=0.85-0.95$), Life style assessing tool, Barthel Index (BI; $\alpha=0.89-0.95$), DASS-21, demographic screening tool and HR-QoL were used. Data were analyzed using SPSS version 27 with descriptive and inferential statistics. Ethical approval was obtained from the Ethics Review Committee, Faculty of Medicine, University of Colombo. The mean age of the sample was 60.34 (± 10.95). Individuals with severe or extremely severe depression, a history of stroke, or moderate-to-severe disability tend to have lower QoL. Depression, anxiety, and stress levels were strongly associated with lower QoL ($p < 0.001$), with severe cases showing significantly worse QoL outcomes. Those with Obesity Class 2 are absent from the high QoL group. Significant associations with QoL were found for family history ($p = 0.021$), Modified Rankin Scale ($p < 0.001$), and Barthel Index ($p < 0.001$). The study highlights the significant impact of psychological factors such as depression, anxiety, and stress on the health-related QoL of stroke survivors in Sri Lanka. Disability level, functional dependence, and family history of stroke were found to be key determinants of QoL outcomes. Strengthening rehabilitation, mental health support, and post-stroke follow-up services are crucial for improving outcomes.

Keywords: *Anxiety, Depression, Health-related Quality of Life, Stress, Stroke*

Attitude, practices, and associated factors towards self-care for chemotherapy side effects among cancer patients at Apeksha Hospital, Sri Lanka

L. L. N. T. Alwis¹, G. V. M. N. Karunarathne¹, K. S. Nimasha¹, K. M. Gampalage¹,
L. S. Ruhunage¹, H. V. D. B. Vidanage¹, K. Nilmini¹, M. M. G. C. Mahanama¹,
M. G. S. Nishara², M. G. A. S. Malkanthie²

¹*Faculty of Nursing, University of Colombo, Sri Lanka*

²*Department of Fundamentals of Nursing, Faculty of Nursing, University of Colombo, Sri Lanka*

Chemotherapy is a common cancer treatment that often leads to significant side effects affecting patients' well-being. Self-care practices are essential for managing these side effects; however, the attitudes involved in self-care can vary based on demographics and clinical factors, which can impact quality of life. The aim of the study was to assess attitudes, practices, and associated factors related to self-care for chemotherapy side effects among cancer patients attending Apeksha Hospital, Maharagama, Sri Lanka. A cross-sectional quantitative study was conducted with 387 patients diagnosed with any type of cancer who were undergoing chemotherapy at Apeksha Hospital. Data were collected interviewer-administered questionnaire and analysed with SPSS version 27.0 using descriptive statistics and chi-square tests. Ethical approval was granted by the Ethics Review Committee, Faculty of Medicine, University of Colombo. A majority of participants (78.6%) had a positive attitude towards self-care for managing chemotherapy side effects. Significant associations were found between attitudes, education level ($p = 0.001$), and employment status ($p = 0.024$). Common side effects reported included fatigue (83.2%), hair loss (88.4%), and loss of appetite (87.6%). Patients commonly used strategies like rest (60.8%), dietary changes (51.5%), medication (69.4%), and wearing wigs (58.8%) to manage these effects. Peripheral neuropathy affected 69.3% of patients, with 32.5% not adhering to any self-care practices. Of those experiencing decreased sexual desire (15.2%), 50.8% communicated with their partner, while 44.1% took no action. Although 87.04% engaged in some form of self-care measures, no significant relationship was found between these practices and attitude levels ($p = 0.366$). Patients demonstrated admirable positivity and engaged in self-care practices to manage the side effects of chemotherapy. Notable variations emerged, particularly concerning neuropathy and sexual health. Factors such as education and employment status significantly influenced these attitudes. Enhancing patient education and supportive strategies is essential for improving self-care and treatment outcomes.

Keywords: *Attitude, Chemotherapy, Practices, Self-care, Side effects*

Knowledge on insulin self-administration, its adherence and associated factors among patients with diabetes mellitus attending diabetic clinics at selected teaching hospitals in Colombo District, Sri Lanka

S. Sangavi¹, W. A. D. Gunasekara¹, K. G. D. Darshana¹, H. W. P. M. Kumari¹,
P. D. T. Nuwandhara¹, K. P. R. T. Wijerathne¹, K. M. N. Damayanthi¹,
D. M. O. T. K. Bandara¹, G. Kisokanth²

¹*Faculty of Nursing, University of Colombo, Sri Lanka*

²*Department of Clinical Nursing, Faculty of Nursing, University of Colombo, Sri Lanka*

Diabetes Mellitus (DM) is a growing global health concern and the second leading cause of death in Sri Lanka. Achieving effective glycaemic control is crucial to prevent complications and relies mainly on proper insulin self-administration and adherence. Adequate knowledge on insulin self-administration enables patients to actively manage their disease condition, resulting in better glycaemic control, and enhancing the quality of life. The aim of this study was to assess the knowledge on insulin self-administration, its adherence and associated factors among patients with DM attending diabetic clinics at selected Teaching Hospitals in the Colombo District, Sri Lanka. A descriptive cross-sectional study was conducted among 422 patients with DM who had been self-administering insulin for more than six months. Data were collected by using a validated and pre-tested interviewer-administered questionnaire. The knowledge score was calculated out of 40 and categorized as Good (76–100%), Adequate (50–75%), and Poor (0–49%). Adherence was assessed using the 4-item Morisky Medication Adherence Scale and classified as High (0), Medium (1–2), and Low (≥ 3) adherence. Descriptive and inferential analyses, including independent samples t-test, one-way ANOVA was performed to check the mean score differences, and chi-square test was performed to identify the associated factors with level of adherence to insulin self-administration using SPSS. A p value < 0.05 was considered significant at all levels. Among the participants, 54.8% were aged between 61 and 80 years, 65.8% were females, and nearly 60% had been diagnosed with DM for more than 10 years. Only 12.5% of the participants scored a good level of knowledge regarding insulin self-administration. In addition, only 23% had high adherence towards insulin self-administration. Hospital that they attended, occupation, monthly income, diagnosis duration, family history, presence of other chronic diseases, medication duration, medication form, clinic attendance and source of insulin were significantly associated with the level of adherence to insulin self-administration ($p < 0.05$). Only a small proportion of patients had good knowledge and high adherence to insulin self-administration. It is recommended to implement targeted intervention that enhance adherence and address the factors associated with adherence to insulin self-administration to improve the glycaemic control and reduce the diabetes-related complications.

Keywords: *Diabetes Mellitus, Insulin self-administration, Knowledge, Adherence, Associated factors*

Genetics-related knowledge, attitudes, and readiness for practice among final-year diploma nursing students in Western Province, Sri Lanka

A. R. M. C. A. K. Alawathupitiya¹, P. W. G. A. V. Jayathilaka¹, W. V. H. Veenavi¹,
M. J. Nawodya¹, R. M. N. M. Rathnayaka¹, T. M. H. Fernando¹, M. E. I. Sumuduni¹,
S. K. A. M. S. Samarasinghe¹, H. S. Senarathne², D. A. S. Elvitigala³

¹*Faculty of Nursing, University of Colombo, Sri Lanka*

²*Department of Clinical Science in Nursing, Faculty of Nursing, University of Colombo, Sri Lanka*

³*Department of Basic Sciences and Social Science in Nursing, Faculty of Nursing,
University of Colombo, Sri Lanka*

Nurses play a vital role in integrating knowledge of genetics in healthcare globally. In Sri Lanka, genetic services show limited expansion, mostly due to limited training in nursing curricula. The objective of this study was to assess the knowledge, attitudes, and readiness to implement practices related to genetics in nursing, and to identify the relationships between knowledge of genetics with attitudes toward practicing genetics in nursing, and knowledge of genetics with readiness to implement genetics in nursing, among final-year diploma nursing students in the Western Province. A descriptive cross-sectional study was conducted among 297 final-year nursing students from three National Schools of Nursing in the Western Province, Sri Lanka, selected through systematic random sampling. Data collection used a validated, self-administered questionnaire, which was pre-tested. Levels of knowledge were categorized as >80% Good, 60-80% Fair, <60% Poor. Descriptive and inferential analyses, including chi-square test, One-way ANOVA and Pearson's correlation were performed using SPSS version 27.0, with significance level at $p < 0.05$. Among a total of 297 nursing students, the majority fell within the age range of 26-28 years (58.2%) and 90.2 % were females. Of the students, 46.5% had a poor level of knowledge in genetics. Majority (65%) had positive attitudes, while 35% of participants had negative attitudes on genetics. Of the participants, 95.3% were ready to practice genetics in nursing. A positive relationship between knowledge and attitudes ($p=0.009$, $r=0.151$) as well as knowledge and readiness ($p<0.001$, $r=0.253$) to practice genetics was detected. Most students had poor knowledge, although they showed both positive attitudes and favourable readiness to implement genetics in nursing practices. Improving genetic education may enhance students' preparedness and confidence in applying genetics in clinical settings. Therefore, integrating genetics-focused training into nursing programmes is vital to prepare nurses for delivering quality, genetics-informed patient care in future.

Keywords: *Genetics in nursing, Knowledge, Attitudes, Readiness to practice, Nursing students*

Awareness, satisfaction, and associated factors of preoperative nursing care among adults undergoing major surgery in selected government teaching hospitals, Colombo District, Sri Lanka

K. N. Thalgaspitiya¹, S. U. Malalagama¹, N. W. K. P. M. Perera¹, H. M. M. S. L. Herath¹,
K. B. Y. P. Dharmasena¹, M. L. D. D. De Costha¹, S. A. L. Chathurangika¹,
N. P. Edirisinghe²

¹*Faculty of Nursing, University of Colombo, Sri Lanka*

²*Department of Fundamental Nursing, Faculty of Nursing, University of Colombo, Sri Lanka*

Preoperative nursing care is integral to surgical outcomes, influencing patient satisfaction and recovery. Multiple factors are associated with patient awareness and satisfaction on preoperative nursing care. There is limited data on such care in government teaching hospitals in Sri Lanka. The study aims to assess awareness, satisfaction and associated factors on pre-operative nursing care among adults who underwent major surgeries at selected government teaching hospitals in the Colombo District, Sri Lanka. A descriptive cross-sectional study was conducted among 430 patients (>18 years) who underwent major surgeries at the National Hospital of Sri Lanka and Colombo South Teaching Hospital. Data were collected using consecutive sampling and a pretested, content-validated, interviewer-administered questionnaire. Descriptive and chi-square analyses were performed using SPSS version 27 ($p < 0.05$). The mean value was used as the cutoff for knowledge levels due to normal data distribution. Among 430 participants, 224 (52.1%) had low awareness, and 206 (47.9%) had high awareness. The mean awareness level was 57.62% ($SD \pm 17.77$). The mean satisfaction level was 80.79% ($SD \pm 10.85$), with 318 (74%) demonstrating high satisfaction and 112 (26%) low satisfaction. Significant associations between awareness with gender ($p=0.020$), marital status ($p=0.018$), income ($p=0.001$), type of surgery ($p=0.019$), illness duration ($p=0.004$), expectations ($p=0.026$), current health ($p=0.003$), healthcare workers in family ($p=0.003$), and caregiver availability ($p=0.011$) were found. Satisfaction was significantly associated with gender ($p=0.006$), illness duration ($p=0.007$), and patient expectations towards nursing care ($p=0.001$). A significant proportion of patients exhibited high awareness, while gaps remained in knowledge about personal preparation. Also, overall satisfaction was impressively high; multiple socio-demographic and surgery-related factors influenced both awareness and satisfaction. Standardized pre-operative health education sessions are recommended to enhance the outcomes.

Keywords: *Pre-operative phase, Pre-operative nursing care, Awareness, Satisfaction, Associated factors*

Readiness for technology usage and its associated factors among selected peri-urban diabetic population in Colombo District, Sri Lanka

M. C. Nimasha², S. P. G. D. H. Karunasinghe², W. A. S. D. Wanigasundara², S. Gobika²,
A. M. S. N. Attanayaka², P. Sajinth², M. S. Abeywickrama², N. Siribaddhana²,
M. W. N. Nisansala¹

¹*Department of Fundamentals of Nursing, Faculty of Nursing, University of Colombo, Sri Lanka*

²*Faculty of Nursing, University of Colombo, Sri Lanka*

Technology plays a pivotal role in management of chronic diseases, such as diabetes. Assessing technology readiness and its associated factors specially among diabetic patients are vital. This can gain substantial benefits to improve health outcomes of diabetic patients by identifying the targeted interventions. This study aimed to assess readiness for technology usage and its associated factors among selected peri-urban diabetic population in the Colombo District, Sri Lanka. A descriptive cross-sectional study was conducted among 422 randomly selected diabetic patients from three selected divisional hospitals in the Colombo District. Data were collected using a pre-tested, researcher-developed, interviewer-administered questionnaire. Technology readiness was measured using 11 items (total score is 17). The scores were converted to percentages and categorized as low (0–49%), moderate (50–70%) and high (71–100%). Independent sample t-tests, one-way ANOVA and chi-square tests were performed using SPSS version 26. A p value < 0.05 was considered as statistically significant. Ethical approval was obtained from the Ethics Review Committee, Faculty of Medicine, University of Colombo. Majority of the participants were females (60.4%) and married (85.3%). The majority had internet device availability (66.4%) and internet access availability (65.4%). However, 43.4% of individuals had never used internet for health-related purposes. Language (62.1%) and cost (60.4%) were the main barriers in using internet. Among the participants, 47.9% had low readiness while 35.3% of them had high readiness for technology usage. The mean readiness for technology usage score was 7.82±5.52. Age, marital status, educational level, occupation and monthly income were significantly associated with the readiness for technology usage (p < 0.05). The findings indicate that the technology readiness level is low among the majority of diabetic patients, a significant technology readiness gap. Interventions; patient motivation, supplying technological devices at low prices, workplace-based digital training, workshops, reducing data package costs and introducing apps for disease management could help in bridging this gap.

Keywords: *Diabetic patients, Readiness for technology usage*

Prevalence and associated factors of poor sleep quality among nursing undergraduates in state universities, Sri Lanka

W. A. S. C. Jayarathna¹, S. Mithurja¹, M. R. Pramodya¹, E. M. M. B. U. B. Ekanayake¹,
H. M. Tharik¹, M. A. L. Udayanganee¹, P. H. W. S. Dharmawardana¹,
M. D. T. L. Gunathilaka²

¹*Faculty of Nursing, University of Colombo, Sri Lanka*

²*Department of Basic Sciences and Social Sciences, University of Colombo, Sri Lanka*

Good sleep is vital for overall well-being, but nursing undergraduates in Sri Lankan state universities often face heavy workloads, academic stress, and clinical demands that affect their sleep quality. Understanding prevalence and contributing factors such as sociodemographic, health, academic, stress-related, and lifestyle factors is key to addressing this issue. The aim of this study was to determine the prevalence and associated factors of poor sleep quality among nursing undergraduates in state universities, Sri Lanka. Stratified random sampling was used to select 412 nursing undergraduates from Sri Lankan state universities for a descriptive cross-sectional study. Those who had commenced academic schedules were included, while those who had completed their studies and were awaiting graduation were excluded. Data were collected using validated, pre-tested online self-administered versions of the Pittsburgh Sleep Quality Index (PSQI) and Perceived Stress Scale (PSS). Ethical clearance was obtained from the Ethics Review Committee, Faculty of Medicine, University of Colombo. Descriptive and inferential analyses were conducted using SPSS (Version 27), with significance set at $p < 0.05$, including chi-square tests. Poor sleep quality (PSQI > 5) was found in 84% ($n = 346$) of participants. The majority of participants were aged 24–26 years (51%). There were 239 females (71.1%), and 251 (60.9%) were of Sinhala ethnicity. Final-year undergraduates made up 146 (35.4%) of the sample. Significant associations were found between poor sleep quality and socio-demographic factors, including place of residence ($p < 0.002$), lifestyle and diet ($p < 0.008$), electronic device use ($p < 0.01$), and sleep hygiene ($p < 0.000$). Clinical rotations ($p < 0.002$) and academic stress ($p < 0.01$) were also significant academic-related factors. The study found that nursing undergraduates in Sri Lankan state universities experience poor sleep quality, linked to factors like living conditions, diet, electronic device use, sleep hygiene, academic stress, and clinical schedules.

Keywords: *Prevalence, Sleep quality, Stress, Nursing undergraduates*

Level of cognitive function and associated factors among community-dwelling older adults in a semi-urban area in Colombo District, Sri Lanka

H. W. I. Kavindya¹, D. G. I. Chathumini¹, K. Nithusha¹, G. T. M. Gunarathna¹,
K. K. P. M. Samaranayaka¹, M. T. S. D. Weerathunga¹, U. L. P. S. Kalpani¹,
U. G. N. Priyadarshani², S. S. P. Warnakulasuriya²

¹*Faculty of Nursing, University of Colombo, Sri Lanka*

²*Department of Clinical Nursing, Faculty of Nursing, University of Colombo, Sri Lanka*

Older adults face various health challenges, including cognitive decline, which significantly affects memory, decision-making abilities, and overall quality of life. Despite the significance of research in this area, limited studies have been conducted in Sri Lanka to identify the level of cognitive function and associated factors. This study aimed to identify the level of cognitive function and the associated factors among community-dwelling older adults in the Homagama Divisional Secretariat area. A descriptive cross-sectional study was conducted among 420 community-dwelling older adults aged ≥ 60 years. The cluster sampling technique was used to achieve the required study sample. Data were collected by administering the Montreal Cognitive Assessment (MoCA) tool, which has been validated for the Sri Lankan context. The maximum score is 30 points and the cut-off value for mild cognitive impairment is <26 points. Data analysis was performed using Statistical Package of Social Sciences (version 27.0). Descriptive statistics, chi-Square test and Pearson's correlation test were performed to assess significant associations. The level of significance was set as $p < 0.05$. Mean age of the study sample was 69 ± 6.83 years. The majority (282, 67.1%) of the participants were females. Mean score for MoCA was 19.30 ± 4.16 . The prevalence of cognitive impairment in the study sample was 93.6%. Cognitive function was significantly associated with hypertension ($p=0.013$), sleep problems ($p<0.001$), use of antihypertensive drugs ($p=0.002$), antihyperglycemic drugs ($p=0.042$), lipid lowering drugs ($p=0.009$), monthly income ($p<0.001$), employment status ($p=0.002$). There was a significant negative correlation between age and cognitive function ($r = -0.285$, $p<0.001$). The prevalence of cognitive impairment among older adults in this sample was high. Cognitive function was significantly associated with age, health conditions, medication use and socioeconomic factors. These findings highlight the need for regular cognitive assessments and targeted interventions to promote healthy aging among older Sri Lankan adults.

Keywords: *Level of cognitive function, Associated factors, Community-dwelling older adults, Semi-urban area*

Adoption of artificial intelligence in selected nursing schools: A study on higher education in nursing in the Western Province of Sri Lanka

S. M. S. Ratnayake¹, T. A. Ratnayake², R. D. Wikramaarachchi³

¹*Department of Health Sciences, NSBM Green University, Sri Lanka*

²*Department of Fundamentals of Nursing, Faculty of Nursing, University of Colombo, Sri Lanka*

³*Faculty of Nursing, University of Colombo, Sri Lanka*

Integration of Artificial Intelligence (AI) in higher education has significantly increased in the field of nursing education to transform traditional teaching and learning methods. This study evaluates AI usage among final-year state diploma nursing students in the Western Province of Sri Lanka. A descriptive cross-sectional study was conducted with 422 participants selected randomly from three state nursing schools in three districts. A self-administered questionnaire was used and data were analyzed with the Statistical Package for the Social Science (SPSS) 27.0 version. Descriptive statistics and inferential statistics were used in data analysis. AI adoption was widespread, with 95.5% (402) of students incorporating AI into their education, while only 4.5% (20) did not. Usage frequency varied with 216 (50%) students utilizing AI several times weekly, 145 (33.6%) daily, fewer 28 (6.5%) monthly, 25 (5.8%) rarely, 5 (1.2%) weekly, and 3 (0.7%) once a month. A negative Pearson correlation indicated that younger students were more likely to adopt AI. Participants reported 1,304 total tool selections across different categories. ChatGPT was the most used and dominant, selected by 403 respondents (95.5%). Language and communication aids (Google Translate and Replika) followed with 310 selections (73.46%). Organizational software (Office 365, Evernote) had 228 users (54.02%), and writing aids (Grammarly, Quill Bot, Zotero) were mentioned 101 times (23.93%). Communication platforms (Slack, Microsoft Teams) 99 times (23.46%), virtual learning aids (Khan Academy, Coursera, and Duolingo) 61 times (14.45%). Less common choices included voice assistants (e.g., Siri, Alexa) with 54 mentions (12.8%), adaptive platforms (e.g., Socratic by Google) 28 mentions (6.63%), miscellaneous tools (24 mentions), and AI research aids (e.g., Mendeley) with 20 mentions (4.74%). Frequent and diverse AI use suggests growing reliance on AI for academic tasks. Usage varies by accessibility and age. Preparing students with skills and ethical awareness is essential for future healthcare settings.

Keywords: *Artificial Intelligence, AI tools, Nursing education, Student engagement, Technology integration*

Trends in hospitalized myocardial infarction incidence in Sri Lanka: A retrospective study

D. K. M. De Silva¹, L. M. U. L. Lewliyadda¹, D. M. O. T. K. Bandara¹, M. W. N. Nisansala²,
M. G. S. Nishara², W. M. D. D. S. Ranasinghe³, S. D. Dharmaratne⁴,
S. S. P. Warnakulasuriya³

¹*Faculty of Nursing, University of Colombo, Sri Lanka*

²*Department of Fundamentals of Nursing, Faculty of Nursing, University of Colombo, Sri Lanka*

³*Department of Clinical Nursing, Faculty of Nursing, University of Colombo, Sri Lanka*

⁴*Department of Community Medicine, Faculty of Medicine, University of Peradeniya, Sri Lanka*

Myocardial infarction (MI) has been one of the leading causes of morbidity and mortality across the world. Since the MI burden is substantial in Sri Lanka, comprehensive data on MI incidence and in-hospital mortality trends are limited. Understanding these trends is crucial for improving patient outcomes and guiding preventive measures. This study aimed to identify the trends in incidence and mortality rates of MI cases in public sector hospitals in Sri Lanka from 2012 to 2021 and to predict future trends. A retrospective study was conducted on secondary data from public sector hospital admissions and in-hospital MI deaths from 2012 to 2021. Data were obtained from the “Annual Indoor Morbidity and Mortality Reports”. The data were entered and analyzed using SPSS V.26. Incidence and mortality rates were calculated per 100,000 population. The auto-regressive integrated moving average (ARIMA) model was used to project the future MI incidence. The incidence rates of MI have increased from 2012 to 2021. For both sexes, it rose from “137” in 2012 to “267” in 2019 before slightly declining to “230” in 2021. Male incidence was consistently higher than female, showing a growth rate of 5.88% annually compared to females (4.86%). Predicted values from 2022 to 2031 suggest a continued rise in MI incidence, with the rate for both sexes projected to reach “390” by 2031. Mortality rates demonstrated fluctuations, with a general increase from “185” in 2012 to “259” in 2019, followed by a decrease to “216” in 2021. The mortality rate due to MI was consistently higher among males compared to females. Hospitalized MI incidence in Sri Lanka has shown an upward trend during the past decade, and is expected to increase in the next decade. This indicates an urgent need for focused preventive measures and strategies.

Keywords: *Myocardial Infarction (MI), Incidence, Mortality, Trends, Sri Lanka*

Knowledge, attitudes and practices related to syphilis among undergraduates of University of Colombo, Sri Lanka

D. M. I. D. Kumara¹, M. S. M. Yoosuf², P. Sankeethan², M. A. A. De Costa²,
W. N. M. L. H. R. Gunathilaka², W. T. P. Hansika², A. D. K. Pieris², B. Ranjani²,
T. S. Amarasinghe³, D. L. N. L. Ubhayawardana⁴

¹ Centre for Research, Nephrology and Transplant Unit, National Hospital Kandy, Sri Lanka

² Faculty of Nursing, University of Colombo, Sri Lanka

³ Acute Medical Unit, Perth Royal Infirmary, Perth, United Kingdom

⁴ Department of Basic Science and Social Science for Nursing, Faculty of Nursing,
University of Colombo, Sri Lanka

Sexually transmitted infections (STIs), including syphilis, constitute a significant global public health problem. University students, as a sexually active population, exhibit diverse levels of knowledge, attitudes, and practices (KAP) concerning syphilis, which can affect the efforts of disease prevention and control. This research aimed to evaluate the knowledge, attitudes, and practices regarding syphilis among undergraduates of the University of Colombo, Sri Lanka. A quantitative cross-sectional study was conducted with 400 third-year undergraduates using proportional convenience sampling from all ten faculties. Data were gathered through a self-administered questionnaire, and participants were classified as having good or poor knowledge based on their total knowledge scores. Attitudes and practices were analyzed descriptively, and associations between demographic variables and KAP indicators were examined using SPSS. The mean age of participants was 24.21 years (SD = 1.64), with 32.5% male and 66.8% female students. The mean knowledge score was 49.04% (SD = 27.41), indicating a moderate level of knowledge. Students from health faculties demonstrated significantly higher knowledge compared to those from non-health faculties ($p < 0.001$). A considerable proportion of students (37.5%) held the misconception that syphilis is not serious because it is curable, a belief significantly associated with gender ($p = 0.002$). While 76.8% of students reported not actively considering syphilis as a personal health concern, 55.8% indicated unwillingness to participate in a syphilis prevention programme. Furthermore, students from non-health faculties were more likely to engage in risky sexual behaviours ($p < 0.05$). In conclusion, the average knowledge on syphilis among participants was moderate at 49%, students from health related faculties exhibited greater understanding than the students from non-health related faculties. Misconceptions about syphilis were prevalent. Most students did not view syphilis as a priority health concern and were disinclined to engage in prevention programmes. Students from non-health related faculties demonstrated higher risk sexual behaviours, highlighting the need for targeted educational and preventive interventions tailored to this population.

Keywords: Syphilis, Knowledge Attitudes and Practices (KAP), University students

FACULTY OF INDIGENOUS MEDICINE



*Sustaining Nature, Sustaining Health: Innovating for a
Better Tomorrow*

15th and 16th August 2025

MESSAGE FROM THE DEAN

Professor Pathirage Kamal Perera

*Faculty of Indigenous Medicine
University of Colombo,
Sri Lanka*



It is a great pleasure to write this message on the occasion of the 11th International Conference on Ayurveda, Unani, Siddha and Traditional Medicine (ICAUST-2025) of the Faculty of Indigenous Medicine, University of Colombo, Sri Lanka under the theme of “Sustaining Nature, Sustaining Health: Innovating for a Better Tomorrow.” This theme is the need of the hour, and timely as far as the present global situation is concerned. This theme underscores the pivotal role of Ayurveda, Unani, Siddha and Traditional Medicine in addressing contemporary health challenges, blending its age-old wisdom with modern advancements to provide holistic healthcare solutions.

Conducting the Annual Research Symposium is a regular event of the faculty, and it has been a great success during the past five years. The 11th International Conference on Ayurveda, Unani, Siddha and Traditional Medicine has a special significance this year as the theme of the symposium is very relevant to the current healthcare landscape as healthcare is being digitalized globally with new inventions and innovations.

I strongly believe that ICAUST-2025 will be very successful as we have organized six technical sessions this year and received a higher number of abstracts, providing more opportunities for scientific dialogue. I would like to express my sincere gratitude to the organizing committee for their efforts in making this event a reality. I also wish to convey my sincere gratitude to the heads of departments, academic staff, assistant registrar and non-academic staff of the Faculty of Indigenous Medicine for extending their fullest support and cooperation to show up the ICAUST-2025. I also congratulate all the presenters who are presenting their research at this symposium. Special thanks to the Keynote Speakers from India and the plenary speakers of the ICAUST-2025. I would like to extend my special thanks to Professor Indika Mahesh Karunathilake, Vice-Chancellor, University of Colombo, for his moral support, visionary leadership, correct guidance and inspiration for the development and smooth functioning of the Faculty of Indigenous Medicine.

I wish all the participants an enjoyable 11th International Conference on Ayurveda, Unani, Siddha and Traditional Medicine organized by the Faculty of Indigenous Medicine and hope it will be a great success!

MESSAGE FROM THE SYMPOSIUM CO-CHAIRS



Assoc. Professor A. P. Anoma Jayasiri

*Department of Ayurveda Pharmacology,
Pharmaceutics and Community Medicine
Faculty of Indigenous Medicine
University of Colombo, Sri Lanka*



Professor M. U. Z. N. Farzana

*Department of Unani Clinical Medicine
Faculty of Indigenous Medicine
University of Colombo, Sri Lanka*

Welcome to the International Conference on Ayurveda, Unani, Siddha and Traditional Medicine-2025 (ICAUST-2025) hosted by the Faculty of Indigenous Medicine, University of Colombo as a component of the Annual Research Symposium of the University of Colombo. This year's conference theme is "Sustaining Nature, Sustaining Health: Innovating for a Better Tomorrow." This conference provides a common platform for academics, researchers, scholars, students, and experts, both nationally and internationally, to disseminate their findings, knowledge, experiences and views on developments in the indigenous medical system. It creates a stimulating environment for further analysis and innovation through novel approaches and collaborative partnerships. We expect ICAUST-2025 to be a platform that advocates for advancements in all related fields, whether in Ayurveda, Unani, Siddha or Traditional Medicine.

The Inauguration ceremony held on 15th August 2025 marked the commencement of the Main Congress. Prof. Indika Mahesh Karunathilake, the Vice-Chancellor of the University of Colombo graced the occasion as the Chief Guest. This year's scientific programme of the Main Congress is unique, as the themes of the symposia and plenaries are centered on the undergraduate curriculum, thereby aiming to achieve greater student engagement while creating awareness, interest and inculcating a research culture. The Congress will also include the presentation of scientific work through oral and poster sessions.

This year, ICAUST-2025 provides an opportunity not only for academics and postgraduate students but also for undergraduates to showcase their knowledge and insights gathered through research. Our goal is to inspire fresh thinking and foster a collaborative spirit that transcends traditional academic confines.

The success of the Congress depends on many people who have worked alongside the organizing committee in planning, organizing the conference, and precise implementation of the activities. We express our sincere gratitude to Prof. Pathirage Kamal Perera, Dean of the Faculty of Indigenous Medicine, University of Colombo for his leadership and constant support. We also wish to extend our gratitude to all the members of committees for their hard work. Special thanks go out to abstract reviewers and keynote speakers, resource persons in the workshops, plenaries and symposia, free paper presenters, judges and session chairs.

Finally, we wish to thank our sponsors for their generous support for our conference. Above all, a big thank you to our audience without whom no conference is complete! We welcome all dignitaries, invitees and delegates to the ICAUST-2025 and wish fruitful deliberations.

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SYMPOSIUM PROGRAMME

15th August 2025

2.00 pm – 2.30 pm	Arrival of Guests
2.30 pm – 2.40 pm	Lighting of the Traditional Oil Lamp
2.40 pm – 2.45 pm	National Anthem and Faculty Song
2.45 pm – 2.55 pm	Dhanvantari Pooja
2.55 pm – 3.00 pm	Welcome Address <i>Prof. A. P. A. Jayasiri, Coordinator, Ayurveda - ICAUST 2025</i>
3.00 pm – 3.10 pm	Address by the Dean, Faculty of Indigenous Medicine <i>Prof. Pathirage Kamal Perera</i>
3.10 pm – 3.20 pm	Launching of the Abstract Book
3.20 pm – 3.30 pm	Address by Vice-Chancellor, University of Colombo <i>Prof. Indika Mahesh Karunathilake</i>
3.30 pm – 3.40 pm	Keynote Address – I <i>Prof. Pradip Kumar Goswami</i> <i>Dean, Faculty of Ayurveda Institute of Medical Sciences</i> <i>Banaras Hindu University, Varanasi, India</i>
3.40 pm – 3.50 pm	Keynote Address – II <i>Prof. Bikash Medhi</i> <i>Chandigarh, India</i>
3.50 pm – 4.00 pm	Cultural Event
4.00 pm – 4.10 pm	Keynote Address – III <i>Dr. Younis Iftikhar Munshi</i> <i>Director, National Research Institute of Unani Medicine for Skin Disorders</i> <i>(CCRUM), Hyderabad, India</i>
4.10 pm – 4.20 pm	Keynote Address – IV <i>Prof. S. Sivakkumar</i> <i>Department of Gunapadam, Chennai, India</i>
4.20 pm – 4.25 pm	Vote of Thanks <i>Prof. M. U. Z. N. Farzana, Coordinator, Unani - ICAUST 2025</i>
4.25 pm	Refreshments

16.08.2025

8.30 am – 10.30 am	Oral Session I	Oral Session II	Oral Session III	Oral Session IV
10.45 am – 12.45 pm	Oral Session V	Oral Session VI	Oral Session VII	Oral Session VIII
1.00 pm – 3.00 pm	Oral Session IX	Poster Session I	Poster Session II	
8.30 am – 10.30 am	Oral Session I (UG)	Oral Session II (UG)	Oral Session III (UG)	Poster Session I (UG)
10.45 am – 12.45 pm	Oral Session IV (UG)	Oral Session V (UG)	Oral Session VI (UG)	Poster Session II (UG)
1.00 pm – 3.00 pm	Poster Session III (UG)			

INTRODUCTION TO THE KEYNOTE SPEAKER

Professor Bikash Medhi

*Department of Pharmacology
Postgraduate Institute of Medical Education and Research
Chandigarh
India*



Dr. Bikash Medhi is a Professor of Department of Pharmacology, Postgraduate Institute of Medical Education & Research (PGIMER), Chandigarh, India, and former Additional Medical Superintendent (AMS), founder of the Experimental Pharmacology Laboratory and Neurobehavioral laboratory (EPL & NBRL Lab: www.eplpgi.in), Editor in Chief of the Indian Journal of Pharmacology (IJP), Editor of the Drug Bulletin, Coordinator of the PGIMER Pharmacovigilance and Materiovigilance Centre, and Regional Coordinator of NADA (North Zone), Ministry of Youth and Sports, Government of India. Prof. Bikash Medhi has published 04 books, 66 book chapters, 482 publications and 06 abstracts and has 8125 citations.

ABSTRACT OF THE KEYNOTE ADDRESS

Clinical Development for Phytopharmaceuticals and Natural Products in a Global Perspective, Including Food Products with Medicinal Value

Professor Bikash Medhi

Department of Pharmacology

Postgraduate Institute of Medical Education and Research

Chandigarh, India

It is my privilege to be here in your midst and be able to address such a distinguished audience on the topic of “Clinical Development for Phytopharmaceuticals and Natural Products in a Global Perspective, including Food Products with Medicinal Value.” As healthcare systems worldwide look for safer, affordable, and holistic approaches in therapeutic avenues, phytopharmaceuticals and natural product-based therapies are gaining renewed attention. Rooted in traditional knowledge and supported by emerging scientific evidence, these products hold immense potential in addressing modern health challenges — ranging from metabolic disorders to antimicrobial resistance. However, transition of natural products from traditional use to clinically approved medicines with great translational values require more than just interest or availability — it demands stringent regulatory compliance, robust preclinical and clinical validation, and standardization of quality, safety, and efficacy assessments. Global regulators, including the CDSCO (India), FDA (USA), and EMA (Europe), are exhaustively working on setting up the framework with respect to standardized guidelines for preparation, storage, and analysis of herbal medicines, phytopharmaceuticals, and nutraceuticals that would ensure these meet the standards required for modern therapeutics. Parallel to this, food products with medicinal value — commonly referred to as nutraceuticals or functional foods — are being scientifically assessed, validated and translated into preventive healthcare strategies. But just like drugs, these also need to ensure that all the domains around their manufacture and distribution, such as labeling, safety- and health-related claims, meet the regulations across markets for such products. Let us work together to bring traditional wisdom into the realm of modern, regulated, and evidence-based healthcare. Thank you.

LIST OF ABSTRACTS

Development and evaluation of herbal wine from fruit of <i>Punica granatum</i> (Pomegranate)	
<i>H. G. H. Lakshani, A. P. A. Jayasiri, U. R. S. K. Senarathna.....</i>	425
A study on <i>Ashta sara</i> status among patients at different stages of chronic kidney disease in Western Province, Sri Lanka	
<i>S. Weerasekara, P. R. Waratenne, E. S. Wijewickrama, N. P. Sunil Chandra</i>	426
Biological evaluation of <i>Samanea saman</i> in comparison to <i>Albizia lebbbeck</i> based on anti-inflammatory and antioxidant potential	
<i>A. P. A. Jayasiri, S. P. Senanayake, A. P. G. Amarasinghe, P. Paranagama</i>	427
Leafy legacy: Exploring the nutritional and cultural significance of traditional Kandyan leafy dishes in Sri Lanka	
<i>I. G. P. R. Kulanatha, S. M. M. D. Keerthisinghe</i>	428
Review on <i>Vachadi shirolepa</i>: A Sri Lankan traditional herbal paste used for <i>Tridoshaja Shiroroga</i>	
<i>D. R. K. Elikewela, L. D. R. De Silva</i>	429
Unani approaches to the management of hypertension (<i>Zaght Ud Dam Qawi</i>): A systematic review	
<i>M. J. H. P. Sabra, M. M. M. Nifras, A. M. Muthalib</i>	430
Effect of <i>Bilwadi panchamula</i> decoction in the secondary prevention of <i>Athisthaulya</i>	
<i>B. L. Edirisinghe, W. M. S. S. K. Kulathunga</i>	431
Decoding gut microbiome diversity through <i>Prakriti</i>: Insights from an Ayurgenomics perspective: A narrative review	
<i>L. A. W. J. Chathurika, C. R. Yadav, S. Yadav</i>	432
Impact of the <i>Ati vyayama</i> (excessive exercise) on pathological outcomes in the heart: A review of experimental studies on Wistar rats	
<i>N. V. Y. Diloopa, P. Divya</i>	433
Effectiveness of <i>Hijama Bila Shurt</i> (dry cupping) and <i>Hijama Bil Shurt</i> (wet cupping) in management of gynecological disorders: A systematic narrative analysis	
<i>H. A. A. Masha, M. U. Z. N. Farzana</i>	434
Clinical study on effect of <i>Ketakeladi paththuwa</i> for anatomical deformed <i>Janu sandhigata vata</i>: An open label, single arm clinical study	
<i>S. Palliyaguru, A. G. Samarawickrama</i>	435

Assessment of antioxidant potential of the freeze-dried and spray-dried forms of <i>Amurthashtaka kwatha</i>	
<i>L. P. S. Vinodani, W. J. A. B. N. Jayasuriya, H. M. D. R. Herath, S. D. Hapuarachchi, P. Dantanarayana, T. S. Suresh</i>	436
Personalized Platelet Rich Plasma (PRP) treatment for androgenetic alopecia: A comprehensive case study	
<i>R. M. C. D. Rathnayaka, M. S. F. Sapra</i>	437
Management of cerebral palsy through integration of physiotherapy with Ayurveda treatment: A case study	
<i>W. A. R. P. Weerasingha, S. M. Bhinde, I. A. M. Leena, C. Chagani</i>	438
Quantitative analysis of total phenolic content, flavonoid and tannins in <i>Careya arborea</i> (Kahata)	
<i>A. P. A. Jayasiri, H. K. L. M. Senasinghe, S. N. I. Fernando</i>	439
Efficacy of Sri Lankan Ayurveda treatment on cases with recurrent adnexal simple cyst with endometriosis: A case study	
<i>B. S. Samarawickrama, Y. A. U. D. Karunarathne, K. P. K. R. Karunagoda</i>	440
Effect of <i>Nasya karma</i> and <i>Karnapurana</i> in the management of <i>Karnanada</i> (Tinnitus): A case series study	
<i>L. D. S. Hansitha, R. H. S. K. De Silva, R. L. Y. U. Rathnayaka</i>	441
Literary study of the external treatment modalities on <i>Dushta vrana</i> in practice	
<i>D. A. A. A. D. Arachchi, D. A. R. Sakunthala</i>	442
Therapeutic effect of Yoga in the management of Hypertension: A case series	
<i>S. N. L. Narathota, Y. S. G. Wimalasiri</i>	443
A study on the association of food habits and childhood obesity in school children of ages 6-14 in Sudharma College, Magalle, Galle in Southern Province	
<i>A. D. W. I. G. Yatawara, I. A. M. Leena, M. W. S. J. Kumari</i>	444
Synergetic effect of <i>Panchakarma</i> based treatment regimen for Parkinson's disease with special reference to <i>Kampa vata</i>: A case report	
<i>K. K. A. Nilani, E. D. T. P. Gunarathna</i>	445
Objective assessment of <i>Manasika prakriti</i>; Integrating Ayurvedic theory with modern temperament research: A systematic literature review	
<i>I. G. P. R. Kulanatha, S. M. M. D. Keerthisingha, C. H. P. Hapuarachchi</i>	446
Therapeutic evaluation of a traditional Sri Lankan herbal oil in the management of diabetic foot ulcers: An observational study	
<i>K. W. Rasangika, N. D. N. Jayawardhane</i>	447

A study on prevalence and influencing factors for junk food consumption among preschool children in Labuduwa Division	448
<i>R. A. C. Lakmali, O. T. M. R. K. S. Kalawana, L. D. R. De Silva</i>	
Morphometric study of the angle of inclination and angle of torsion of the humerus using digital imaging techniques	449
<i>S. P. A. S. Nishan, B. Jat, R. Sharma, S. K. Yadav, D. Choudhary</i>	
Ayurveda dietary and herbal interventions on gut microbiome modulation in metabolic disorders: A systematic review	450
<i>K. G. D. Kothalawala, P. A. N. G. Perera</i>	
Evaluation of <i>in-vitro</i> glycemic regulatory and cholesterol lowering activity of two varieties of <i>Cinnamomum zeylanicum</i> Blume	451
<i>L. N. L. Lekamge, W. J. A. B. N. Jayasuriya, S. D. Hapuarachchi, H. M. D. R. Herath</i>	
Unani perspective on <i>Qillat-E-Ifraz-E-Darqiyya</i> (Hypothyroidism): A comprehensive literature review	452
<i>M. F. F. Fasmila, M. M. M. Nifras, A. M. Muthalib</i>	
Comparative pharmaceutical analysis of <i>Vajrakshara</i> (<i>Swethaparpati</i>) prepared using three variants of <i>Suryakshara</i>	453
<i>S. M. K. S. Ranasinghe, U. R. S. R. K. Senarathne</i>	
Pharmacognostic evaluation of the leaves of <i>Atalantia ceylanica</i> (Arn.) Oliv.: An anatomical and microscopic approach	454
<i>P. A. N. G. Perera, K. S. Hiripitiy, P. A. C. D. Veerasiri, B. P. Udani</i>	
Potential of bitter taste as a therapeutic tool: Integrating Ayurveda principles with modern pharmacology	455
<i>K. N. A. Dharmasena, N. D. Kodithuwakku</i>	
Preliminary phytochemical screening, physicochemical analysis and chromatographic fingerprint of <i>Avalgужagajalindhaji lepa</i>	456
<i>A. G. Samarawickrama, D. I. Uluwaduge, R. D. H. Kulathunga</i>	
Evaluating the role of Ayurveda management in <i>Yuvana Pidaka</i> with special reference to <i>Acne vulgaris</i>: A case study	457
<i>S. M. M. W. Kumari, R. L. Y. U. Rathnayake</i>	
An analytical review on the concept of <i>Dhatukshaya</i> and <i>Avarana</i> in the pathogenesis of <i>Madhumeha</i>	458
<i>S. K. A. C. S. Senanayake</i>	
A literature review on <i>Sulugulu Yavagu</i>: A historical perspective	459
<i>P. S. R. Perera, K. P. K. R. Karunagoda</i>	

Effectiveness of <i>Satavar</i> (<i>Asparagus racemosus</i>) in the management of postmenopausal symptoms: A systematic review	
<i>M. N. F. Naazneen, A. M. Muthalib</i>	460
A pharmacognostical standardization of <i>Justicia adhatoda</i> Linn (Acanthaceae) used in Ayurveda and traditional medicinal system of Sri Lanka	
<i>J. M. Dahanayake, P. K. Perera, P. Galappaththy, L. D. A. M. Arawwawala</i>	461
Development and standardization of Ayurveda natural hair pack for hair growth and scalp health	
<i>L. Prakatheeswaran, P. K. Perera, J. M. Dahanayake</i>	462
Comparative pharmacognostical, phytochemical and chromatographical analysis of <i>Sharivadvaya</i>	
<i>P. A. C. D. Veerasiri, N. D. Kodithuwakku, K. N. A. Dharmasena</i>	463
Development and standardization of <i>Parijata</i> (<i>Nyctanthes arbortristis</i> L.) flower based novel herbal tea as a potential functional beverage for diabetes mellitus (<i>Madhumeha</i>)	
<i>S. M. Palathiratne, J. M. Dahanayake, P. A. N. G. Perera</i>	464
Ayurveda and traditional treatment regime for <i>Greeva sandhigathavata</i>: A case report	
<i>D. K. P. P. Dissanayake, R. D. H. Kulathunga</i>	465
<i>Lagenaria siceraria</i> (bottle gourd) as a functional food: A systematic review of its nutritional composition, bioactive constituents, and therapeutic potential	
<i>F. A. Jamaldeen, N. D. Kodithuwakku, A. P. A. Jayasiri</i>	466
Nutritional values and medicinal applications of <i>Sharbat-E-Sazoori</i>: A review	
<i>M. N. F. Rizniya, M. S. M. Nasmeer, M. R. M. Rifae, M. M. F. Thasneem</i>	467
Evaluate the efficacy of the Ayurveda treatment regime in the management of <i>Kitibha kushta</i> with special reference to psoriasis: Case series	
<i>R. A. J. W. Rajapaksha, N. D. N. Jayawardhana, K. R. Weerasekara</i>	468
Anti-inflammatory and hypolipidemic properties of an Ayurvedic polyherbal formulation and its raw materials	
<i>K. D. C. Madhushika, S. D. Hapuarachchi, T. S. Suresh, P. K. Perera, N. D. Kodithuwakku, J. M. Dahanayake, L. A. D. M. Arawwawala</i>	469
Effect of <i>Nasya karma</i> with Ayurveda treatment regimen in the management of <i>Avabhahuka</i> with special reference to frozen shoulder: Case series study	
<i>T. Rajapakse, R. H. S. K. De Silva</i>	470
Amalgamation of artificial intelligence with Sri Lankan Ayurveda medicine: A comprehensive review	
<i>R. M. D. Jayathilake, K. P. K. R. Karunagoda, W. M. C. J. T. Kithulwatta</i>	471

Hijama therapy; A non-pharmacological intervention in health promotion and therapeutic management as adjuvant therapy: A review	
<i>M. H. M. Nazeem, M. J. H. P. Sabra, M. I. Manuha</i>	472
Evaluating the efficacy of <i>Balakoranda taila kati vasti</i> and <i>Kumburu etaadhi pinda sweda</i> in the management of <i>Katigraha</i> (Lumbar spondylosis)	
<i>G. Sanjida, A. G. Samarawickrama</i>	473
Nutritional assessment of preschool children in the plantation areas, Baddegama and Nagoda in Southern Province, Sri Lanka	
<i>N. P. Wijesinghe, W. A. S. S. Weerakoon, D. P. A. Dissanayaka</i>	474
Role of <i>Imly</i> (<i>Tamarindus indica</i>) and <i>Zanjabeel</i> (<i>Zingiber officinale</i>) in the management of <i>shaqeeqa</i> (migraine): A comprehensive review	
<i>M. S. F. Sapra, E. M. G. K. N. Begum</i>	475

Development and evaluation of herbal wine from fruit of *Punica granatum* (Pomegranate)

H. G. H. Lakshani¹, A. P. A. Jayasiri², U. R. S. K. Senarathna²

¹*Department of Indigenous Medical Resources, Faculty of Indigenous Medicine, Gampaha Wickramarachchi University of Indigenous Medicine, Sri Lanka*

²*Department of Ayurveda Pharmacology, Pharmaceutics and Community Medicine, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

The present study focuses on the formulation, development, and evaluation of herbal wine (HW) from *Punica granatum* (pomegranate) (Pg) fruit, aiming to enhance its nutraceutical potential, antioxidant properties, and fermentation efficiency, and to ensure product quality. HW was prepared using pomegranate as the main ingredient, and spices such as clove, cinnamon, cardamom, and mace as well as orange peel and lime as minor ingredients to enhance the flavor. Controlled fermentation with yeast occurred over 10 days at room temperature. After filtration, it was clarified for 21 days, then separated and aged for two weeks to enhance the flavour, stability, and remove unwanted residues. HW was evaluated for sensory qualities, pH at 27°C, specific gravity, alcohol content, acidity, alkalinity, Total Dissolve Solids (TDS), antioxidant activity determination by DPPH Assay and refractive index. Phytochemical screening and TLC confirmed the presence of bioactive compounds. Antibacterial activity was tested using well and disc diffusion methods against *E. coli* and *Staphylococcus aureus*. Yeast and mold counts were determined. Observations revealed a pH of 3.90 at 27°C, specific gravity of 1.0543, an alcohol content of 6.5% v/v, TDS of 30.06 g/L (9.96%), acidity of 4.16%, alkalinity of 0.015%, antioxidant activity with an IC₅₀ value of 0.0914 µg/mL. Refractive index value was not detected. Phytochemical screening test revealed the alkaloid, flavonoid, tannins, saponin, glycoside are positive. These findings support the development of nutraceutical herbal wine with therapeutic and commercial viability. Further studies on long-term stability, consumer acceptability, or clinical validation are recommended for broader application.

Keywords: *Punica granatum*, Herbal wine, Functional alcoholic beverage, Antioxidant

A study on *Ashta sara* status among patients at different stages of chronic kidney disease in Western Province, Sri Lanka

S. Weerasekara¹, P. R. Waratenne¹, E. S. Wijewickrama², N. P. Sunil Chandra³

¹Department of Basic Principles, Ayurveda Anatomy and Physiology, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka

²Department of Clinical Medicine, Faculty of Medicine, University of Colombo, Sri Lanka

³Department of Medical Microbiology, Faculty of Medicine, University of Kelaniya, Sri Lanka

The assessment of *Ashta sara*, which reflects an individual's *Bala pramana* (strength), is essential in evaluating patient health from an Ayurveda perspective, particularly in chronic illnesses like chronic kidney disease. This study aimed to assess *Ashta sara* status (tissue excellence status in *Sapta dhatu* and *Sattva*) among patients at different stages of chronic kidney disease in Western Province, Sri Lanka. The *Ashta sara* status of a total of 113 patients with chronic kidney disease (CKD stages 1–5), diagnosed according to the Western Medical System, were evaluated using a validated questionnaire which expresses an individual's overall *Dhatu sarata* based on weighted mean scores. A calculated percentage of each *Sarata* was categorized into three: 66.7 – 100% as *Pravara*, 33.4 – 66.6% as *Madhyama* and 0 – 33.3% as *Avara*. In stages 1 and 2, tissues from *Rasa* (plasma) to *Shukra* (semen/ovum) predominantly exhibited *Pravara sara* (optimal status). However, a gradual decline in *Sara* status was noted with disease progression. By stage 3, *Pravara sara* was seen only up to *Medas* (fat), while later *Dhatu* showed *Madhyama sara* (moderate status). In stages 4 and 5, most *Dhatu* showed *Avara sara* (inferior status), with even *Rasa* showing signs of deterioration. A consistent pattern of declining mean percentage scores from *Rasa* to *Shukra* indicated impaired *Dhatu* nourishment, aligning with the Ayurveda concept of *Dhatu poṣaṇa*. A notable drop between *Medas* and *Asthi* (bone) may be linked to the role of *Vrikka* (kidneys) in *Medovaha srotas*, affecting downstream tissue strength. Interestingly, *Sattva sara* (mental strength) was reduced even in stage 1, highlighting potential psychological effects of chronic kidney disease. Statistical analysis revealed a significant association ($p < 0.05$) between chronic kidney disease stage and *Ashta sarata*, where declining *Sara* scores reflected lower *Bala pramana* and deteriorating health.

Keywords: *Ashta sara*, *Bala pramana*, CKD, Disease stages, Mean percentage score

Biological evaluation of *Samanea saman* in comparison to *Albizia lebbeck* based on anti-inflammatory and antioxidant potential

A. P. A. Jayasiri¹, S. P. Senanayake², A. P. G. Amarasinghe¹, P. Paranagama³

¹Department of Ayurveda Pharmacology, Pharmaceutics and Community Medicine,
Faculty of Indigenous Medicine, University of Colombo, Sri Lanka

²Department of Plant and Molecular Biology, Faculty of Science, University of Kelaniya, Sri Lanka

³Department of Chemistry, Faculty of Science, University of Kelaniya, Sri Lanka

Samanea saman is a Mara variety of the family Fabaceae commonly available in Sri Lanka. Substitution is replacement of an original drug with an equivalent commonly available drug having similar pharmacological properties and action to the original one. The objective was to biologically evaluate anti-oxidant and anti-inflammatory activities of *Samanea saman* for use as a substitute for *Shireesha: Albizzia lebbeck* - rarely available, well-known pain relieving (*Vedanasthapana*) drug with pharmacological properties of sweet taste, sharpness in quality, hot in potency, pungent in post digestive state. A previous survey reported and confirmed that *Samanea saman* is commonly available in the drug market. Phytochemicals were analyzed in powdered stem bark of methanol and aqueous extracts. Both extracts were evaluated for anti-oxidant activity with DPPH assay method compared to standard BHT, and anti-inflammatory activity using red blood cell membrane stabilizing method and compared with standard Aspirin. The concentration of the extracts needed to produce 50% inhibition IC₅₀ value was calculated using Probit analysis (MINITAB Release 14.2 statistical software). Both extracts were positive for phytochemicals tannins, phenolic compounds, alkaloids, saponins, glycosides and flavonoids. Previous research reported same phyto-chemicals were positive in stem bark of *Albizzia lebbeck* with IC₅₀ values 48.62, and 0.11 (μg/ml) for anti-oxidant and anti-inflammatory activities respectively. The DPPH free radical scavenging activity of methanol and aqueous extracts exhibited an IC₅₀ values 75.909 (μg/ml) and 68.38 (μg/ml) respectively compared to BHT 55.07 (μg/ml). IC₅₀ values for anti-inflammatory activity in methanol and aqueous extracts were 0.40 (μg/ml), and 0.37 (μg/ml) respectively compared to standard Aspirin 0.12 (μg/ml). Based on the results, it can be concluded that *Samanea saman* is similar to *Albizzia lebbeck* in selected biological activities and pharmacological properties, and it is a suitable substitute for *Albizzia lebbeck* due to its availability. Further studies are required to evaluate and compare the analgesic and antidote potentials of the two plants.

Keywords: *Phytochemicals, Anti-oxidant, Anti-inflammatory, Substitute, Pain relieve*

Leafy legacy: Exploring the nutritional and cultural significance of traditional Kandyan leafy dishes in Sri Lanka

I. G. P. R. Kulanatha¹, S. M. M. D. Keerthisinghe²

¹*Department of Basic Principles, Ayurveda Anatomy and Physiology, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

²*Department of Chemistry, Faculty of Graduate Studies, University of Kelaniya, Sri Lanka*

This study investigates the unique cultural and dietary significance of traditional Kandyan leafy vegetables in Sri Lanka. It aimed to analyze the historical role, nutritional value, and contemporary relevance of leafy vegetables to sustainable food practices, bridging traditional knowledge with modern science. Employing a mixed-methods approach, qualitative data were gathered until data saturation was reached, exploring the cultural significance, preparation methods, and perceived health benefits of selected leafy vegetable preparations from 17 adult interviews. These qualitative insights were systematically combined with a comprehensive scientific literature review (2014-2024) focusing on pharmacodynamics and phytochemical analysis. This integration was crucial for providing scientific corroboration for traditional dietary wisdom and contextualizing findings within modern nutritional understanding. Seven leafy vegetable preparations comprised 21.875% of the 32 dishes discussed. "*Ala kola dalu anama*" was most frequently mentioned by interviewees (31.25%), followed by "*Thamberiya kola malluma*" (9.375%). The remaining five leafy dishes were each mentioned by ~6.25% of interviewees. These preparations offer rich nutritional benefits for a balanced diet. Significantly, the study found *Chavaya* (*Siviya*) leaves used as a garnish (3.125%), highlighting Ayurvedic practices for digestive health. Findings underscore the potential of revitalizing traditional Kandyan leafy preparations to enhance modern diets and foster cultural appreciation. Promoting these nutrient-rich, culturally significant vegetables boosts local agricultural economies, enhances biodiversity, and strengthens sustainable food systems in Sri Lanka. Integrating this knowledge into health and nutrition programmes improves public health while preserving Sri Lanka's rich culinary heritage. This study contributes to understanding the nation's culinary traditions and their implications for sustainable living.

Keywords: *Kandyan cuisine, Leafy vegetables, Chavya garnishing, Sustainable food systems*

Review on *Vachadi shirolepa*: A Sri Lankan traditional herbal paste used for *Tridoshaja Shiroroga*

D. R. K. Elikewela, L. D. R. De Silva

*Department of Ayurveda Medicine and Indigenous Medicine, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka*

Shiroroga broadly refers to a spectrum of painful conditions manifesting in the *Mastishka* (head). According to Ayurveda *Tridoshaja shiroroga* is a very painful condition of the head caused by the simultaneous aggravation of all three *Dosha*. The aim of the study was to review on *Vachadi shirolepa*: herbal paste mentioned in Thalpathe piliyam book used in *Tridoshaja shiroroga*. The data were collected from authentic Ayurveda and modern texts, journal articles and scientific databases. Observations were recorded and results were analyzed by percentage. The herbal ingredients of *Vachadi shirolepa* possessed with *Katu rasa* mainly (50%) while the prominent *Guna* was *Laghu guna* (36.48%). *Ushna veerya* (87.5%) and *Katu vipaka* (75%) were significant. *Katu rasa*, *Ushna veerya* and *Laghu guna* are responsible for pacifying *Vata*, *Kapha* and *Pitta dosha*. The most prominent *Karma* was *Vata-kapha shamaka* (87.5%) while the prominent *Guna karma* of the ingredients were *Vedanananshaka*, *Kaphanissaraka*, *Kaphaghna* and *Jeewaniya* which are responsible in alleviating the severity of the headache. The majority of ingredients possessed properties such as analgesic, antimicrobial, anti-inflammatory and antioxidant, which excel in providing acute symptom relief. The ingredients contain flavonoids, alkaloids, phenolic acids, tannins, saponins, terpenoids and glycosides as phytochemicals. According to the pharmacodynamic properties, *Dosha karma*, *Guna karma*, modern pharmacological attributes and secondary metabolites, *Vachadi shirolepa* is capable of managing *Tridoshaja shiroroga* based on *Dosha vyadhi viparitha* concept. Hence, *Vachadi shirolepa* can be logically proven as a promising and effective external paste in the management of *Tridoshaja shiroroga*. Further, efficacy can be validated by conducting large sample clinical trials which is of social importance.

Keywords: *Analgesic, Antioxidant, Dosha karma, Flavonoids, Shiroroga*

Unani approaches to the management of hypertension (*Zaght Ud Dam Qawi*): A systematic review

M. J. H. P. Sabra¹, M. M. M. Nifras², A. M. Muthalib¹

¹*Department of Unani Clinical Medicine, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka*

²*Department of Unani Materia Medica, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka*

Hypertension, a major risk factor for cardiovascular morbidity and mortality, is increasingly prevalent worldwide. Unani medicine offers an approach to managing hypertension (*Zaght ud dam Qawi*) through Dietotherapy (*Ilaj bil Ghiza*), Pharmacotherapy (*Ilaj bil Dawa*), Regimenal therapies (*Ilaj bil Tadbeer*) and Six essential factors (*Asbab-e-Sitta Zarooriyah*). This systematic review aims to evaluate the efficacy, safety, and conceptual framework of Unani approaches in the management of hypertension. A comprehensive search was conducted across various databases, including PubMed, and Google Scholar, and traditional Unani texts to identify relevant studies. Search terms such as ‘Hypertension’, ‘*Zaght ud dam Qawi*’, ‘*Imtila*’ combined with ‘Unani Medicine’, ‘lifestyle modifications’ were used for articles published from 2015 to 2025. A total of 26 articles were filtered and scrutinized. Studies were screened based on PRISMA guidelines. The findings included, focusing on Dietotherapy, Pharmacotherapy, Regimenal therapies, and Lifestyle modifications (*Asbab-e-Sitta Zarooriyah*). The review identified many natural remedies from Unani medicine have been used for hundreds of years to help treat high blood pressure. These remedies work in different ways, such as thinning the blood (*Latafat*), breaking down thick or sticky fluids in the body (*Tahallul*), and removing extra waste (*Istiferagh*). Several Unani formulations and herbs demonstrate anti-hypertensive effects. Regimenal therapies, including Purgation (*Ishaal*), Venesection (*Fasd*), Cupping (*Hijama*), and Massage (*Dalk*), provide non-pharmacological means to alleviate blood pressure and restore balance within the body. Dietary and lifestyle modifications also showed supportive evidence. However, more rigorously designed randomized controlled trials are required to validate these findings and facilitate integration into evidence-based practice.

Keywords: *Hypertension, Imtila, Lifestyle modifications, Unani medicine, Zaght ud dam Qawi*

Effect of *Bilwadi panchamula* decoction in the secondary prevention of *Athisthaulya*

B. L. Edirisinghe¹, W. M. S. S. K. Kulathunga²

¹Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka

²Department of Ayurveda Pharmacology, Pharmaceutics and Community Medicine,
Faculty of Indigenous Medicine, University of Colombo, Sri Lanka

Worldwide at least 2.8 million people die each year as a result of being overweight or obese. The risk of coronary heart disease, ischemic stroke, and type 2 diabetes mellitus has increased steadily with increasing body mass index. Acharya Chakra has mentioned that "*Athisthaulya*" refers to *Nanathmaja vikara* of *Kapha*. *Athisthaulya* is a person who has an excessive increase of fat and muscles presenting pendulous buttocks, abdomen, and breasts and suffers from deficient metabolism which is called Obesity. This study aims to evaluate the efficacy of *Bilwadi Panchamula* in the secondary prevention of *Athisthaulya*. A simple random sampling technique was used to select, from a random number generator defining BMI criteria which is $25 < \text{BMI} < 34.99$, patients of *Athisthaulya* attending the outpatient department of the Ayurveda National Hospital, and were registered for this study. The sample size was calculated using Lawanga and Lemeshow (1991), based on Ayurveda National Hospital statistics. ERC approval was received from Faculty of Indigenous Medicine. Patients were given treatments for four weeks with 1-month follow-up. Patients were given specific instructions on diet and lifestyle modifications without giving a special diet control schedule. This was carried out for six months. The sample size was 45. Majority of them were in the age group between 41-50 years (52.2%) and the mean age was 46.30 ± 7.58 . The majority of them were married (91.11%), Buddhist (73.3%), Educational level is GCE Ordinary Level (53.3%), worked as officers (36.67%), and lived in urban areas (64.4%). Objective parameters such as Body weight, BMI, and waist circumference in patients were reduced highly significantly ($p < 0.001$) except for mid-upper arm circumference. Also, it was proved that all the subjective parameters of the study were highly significant presenting the p-value.

Keywords: *Athisthaulya*, *Bilwadi panchamula*, BMI

Decoding gut microbiome diversity through *Prakriti*: Insights from an Ayurgenomics perspective: A narrative review

L. A. W. J. Chathurika¹, C. R. Yadav², S. Yadav²

¹*Department of Basic Principles, Ayurveda Anatomy and Physiology, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

²*Post Graduate Department of Kriya Sharir, National Institute of Ayurveda, Jaipur, India*

Ayurveda classifies individuals into three major *Prakriti* types *Vata*, *Pitta*, and *Kapha* based on *Dosha* dominance at the time of conception. Ayurgenomics aims to integrate this traditional concept with molecular biology, offering a novel lens to explore individual variations in gut microbiome diversity. This narrative review followed a systematic search strategy across PubMed, Research Gate, and Google Scholar. Six relevant studies published between 2018 and 2025 were selected. These studies employed cross-sectional designs using 16S rRNA sequencing, metagenomic profiling, and predictive functional analysis to explore microbial patterns across *Prakriti* types. Distinct gut microbial profiles were associated with each *Prakriti*. *Vata* types showed enrichment of microbes involved in carbohydrate metabolism, *Pitta* types with oxidative stress and toxin degradation pathways, and *Kapha* types with lipid metabolism and obesity-linked functions. Key taxa like *Bacteroides*, *Prevotella*, and *Faecalibacterium* varied in abundance among groups. Some studies extended findings to oral and skin microbiota. Functional similarities with Korean Sasang types supported the broader relevance of constitution-based biology. The reviewed evidence indicates a strong association between *Prakriti* and microbial diversity, supporting Ayurveda's personalized health concepts. By linking constitutional types with gut microbial signatures, Ayurgenomics can guide targeted health strategies that are preventive, inclusive, and culturally grounded. These insights contribute toward promoting individualized, evidence-based interventions that enhance well-being and disease prevention. Further longitudinal and multi-layered studies are needed to validate these associations and explore clinical applications.

Keywords: *Ayurveda, Prakriti, Gut microbiome, Ayurgenomics, Personalized medicine*

Impact of the *Ati vyayama* (excessive exercise) on pathological outcomes in the heart: A review of experimental studies on Wistar rats

N. V. Y. Diloopa¹, P. Divya²

¹*Department of Ayurveda Medicine and Indigenous Medicine, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

²*Department of Roga Nidan Evum Vikriti Vignana, Sri Dharmasthala Manjunatheshwara College of Ayurveda & Hospital, Hassan, Karnataka, India*

Cardiac disorders are recognized as a leading cause of morbidity and mortality in the present world. Ayurveda authentic texts explain cardiac diseases under the heading of '*Hridroga*' and its etiopathogenesis. Charaka Samhitha has mentioned that '*Ati Vyayama*' (Excessive exercise) is an etiology leading to '*Hridroga*'. The objectives of this systematic review are to evaluate the effect of excessive exercise on the changes of the heart and understand the concept of '*Ati vyayama*' as a cause to manifest '*Hridroga*'; based on the available experimental animal studies in Wistar rats. Research articles published during 2019 and 2023 in ScienceDirect, PubMed, the Directory of Open Access Journals, and Google Scholar are rectified by using keywords; "swimming", "treadmill", "rotarod", "overtraining", "forced exercise", "excessive exercise", "exhaustive exercise", "exercise", "heart", "cardiac", "cardio", "myocardium" and Wistar albino. Open-access original research work consisting of exercise protocols based on swimming or treadmills for healthy Wistar rats were included. Studies to find pharmacological effectiveness and studies incorporated with disease-induced animal models were excluded. A total of 101 articles were rectified based on the abstracts, and 90 were excluded due to non-relevance and duplications. The finalized publications have revealed the impact of excessive exercise on manifestation of pathological changes in the rats' heart in acute, sub-acute, and chronic stages of exercising by increased oxidative stress, altered lipid metabolism, altered heart rate, and histopathological changes of the cardiac muscles of Wistar rats. Health-beneficial effects of regular trained exercise were recorded as promoting cardiomyocyte contractility, improvement in the intracellular Ca²⁺ handling. These findings depend upon the respective exercise protocol, workload over the rat, intensity, and chronicity of the particular exercise. Thus, this review supports the statement that '*Ati vyayama*' can lead to manifest '*Hridroga*' and there are certain limits of aforesaid physical exercise for maintaining health in Wistar rats.

Keywords: *Ati Vyayama, Excessive exercise, Heart, Hridroga, Wistar rats*

Effectiveness of *Hijama Bila Shurt* (dry cupping) and *Hijama Bil Shurt* (wet cupping) in management of gynecological disorders: A systematic narrative analysis

H. A. A. Masha, M. U. Z. N. Farzana

*Department of Unani Clinical Medicine, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka*

The word *Hijama* is used in Unani system of medicine for cupping. It is the application of suction cups to the skin to draw out stagnant, congested blood and Vital Force, as well as other stagnant or morbid humors. These are increasingly and widely applied in managing gynecological disorders such as, dysmenorrhea, chronic pelvic pain, menorrhagia, polycystic ovarian disease, postpartum pain, and anxiety. The present systematic narrative review aims in evaluating clinical evidences on the effectiveness of *Hijama Bila Shurt* (dry cupping) and *Hijama Bil Shurt* (wet cupping) in gynecological diseases. A systematic search of electronic databases was conducted to identify relevant studies including randomized controlled trials, observational studies, pilot studies and preliminary studies through authoritative text books and peer reviewed scientific journals via PubMed, Google scholar, Scopus and Science Direct between 2012-2025. The search strategy combined terms such as "cupping," "*Hijama*," "dry cupping," "wet cupping," and "gynecological diseases". Inclusion criteria targeted clinical trials on gynecological conditions using cupping therapy with full-text availability. Studies were screened according to PRISMA using guidelines, and their quality was assessed using the Jadad scale. A total of 267 potentially relevant studies were found, although subsequently duplicates, irrelevant data, and insufficient data, were excluded. Finally, 42 studies were organized by condition, and narratively analyzed. Animal studies, editorials and non-gynecological conditions were excluded. This holistic approach advances gynecological diseases understanding, pioneering therapeutic alternatives in primary dysmenorrhea, PCOS, menorrhagia, postpartum pain, and anxiety, often outperforming standard treatments. However, it was noted that the evidence was limited by small sample sizes, lack of blinding, heterogeneous interventions and lack of standardized protocols. Further rigorously designed randomized controlled trials are essential to substantiate the safety and efficacy of cupping therapy in women's health and to validate the traditional concepts proposed by Unani scholars.

Keywords: *Hijama, Gynecological diseases, Cupping, Clinical trials*

Clinical study on effect of *Ketakeladi paththuwa* for anatomical deformed *Janu sandhigata vata*: An open label, single arm clinical study

S. Palliyaguru¹, A. G. Samarawickrama²

¹Ayu Sri Ayurveda Hospital, No. 39, Chirst King Road, Weligampitiya, Ja-ela, Sri Lanka

²Department of Ayurveda Medicine and Indigenous Medicine, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka

Sandhigata vata is a clinical condition; *Prakupita vata* affects *Sandhi* and causes *Sandhishula*, *Sandhishotha*, and *Sandhigraha*. A study was carried out open label, single arm clinical study with pre- and post-test design at Ayu Sri Ayurveda Hospital. The present study was designed to evaluate the effect of *Ketakeladi paththuwa* for anatomical deformed *Janu sandhigata vata*. Ethical approval was taken from ERC-23/208/FIM. Present study was conducted on 30 patients aged between 50 - 70 years, diagnosed by cardinal symptoms and X-ray findings. Intervention was done by the application of *Ketakeladi paththuwa* with *manupulation reduction* on affected *Janu sandhi* for a period of one month. All the patients were examined weekly based on gradings given for signs and symptoms. Assessment was done by considering changes in the subjective and objective parameters before and after treatment. In this study 44.89% were in 50 - 60-year age group. According to sex 59.18% were female patients. Improvement of walking time was 61.15%, improvement of climbing time was 68.88%, left knee joint flexion (*Sandhigraha*) percentage of relief was 65.31%, while in right knee joint flexion it was 57.42%. Out of 30 patients, 9 (30%) got complete remission, 12 (40%) got marked improvement, and 8 (26.67%) got mild improvement and one patient remained unimproved. These results were statistically significant at the level of $P < 0.001$. Therefore, manipulation reduction with applying *Ketakeladi paththuwa* attributed to the regenerative action of *Janu sandhi*.

Keywords: *Ketakeladi paththuwa*, *Janu sandhigata vata*, *Sandhishula*, *Sandhishotha*

Assessment of antioxidant potential of the freeze-dried and spray-dried forms of *Amurthashtaka kwatha*

L. P. S. Vinodani¹, W. J. A. B. N. Jayasuriya¹, H. M. D. R. Herath¹, S. D. Hapuarachchi²,
P. Dantanarayana³, T. S. Suresh⁴

¹Department of Pharmacy and Pharmaceutical Sciences, Faculty of Allied Health Sciences,
University of Sri Jayewardenepura, Sri Lanka

²Department of Ayurveda Pharmacology, Pharmaceutics and Community Medicine,
Faculty of Indigenous Medicine, University of Colombo, Sri Lanka

³State Pharmaceuticals Manufacturing Corporation, Sri Lanka

⁴Department of Biochemistry, Faculty of Medical Sciences, University of Sri Jayewardenepura,
Sri Lanka

The antioxidant potential of medicinal plants is attributed to diverse phytoconstituents that mitigate oxidative stress, supporting disease management and health maintenance. *Amurthashtaka kwatha* is an ayurvedic polyherbal decoction composed of eight medicinal plants. This study aimed to evaluate antioxidant potential of freeze dried and spray dried powders of *Amurthashtaka kwatha* using the 2,2-diphenyl-1-picrylhydrazyl (DPPH), 2,2'-azinobis (3-ethylbenzthiazoline-6-sulphonic acid (ABTS) and ferric reducing antioxidant power (FRAP) methods. In both DPPH and ABTS assays, the half maximal inhibitory concentration (IC₅₀) was calculated, whereas in the FRAP assay, the concentration required to achieve target absorbance 0.5 was determined. Ascorbic acid, Trolox, and ferrous sulphate were used as respective positive controls. The IC₅₀ value of standard ascorbic acid and Trolox in DPPH assay were 9.927±0.63 µg/mL and 10.36±0.92 µg/mL respectively, while those for the freeze-dried and spray-dried powders were 128.70±0.55 µg/mL and 167.60±0.90 µg/mL (p<0.05) respectively. In the ABTS assay, the IC₅₀ values of ascorbic acid and Trolox were 6.93±0.25 µg/mL and 61.75±0.80 µg/mL, while the freeze-dried and spray-dried powders recorded 248.50±0.95 µg/mL and 281.50±0.81 µg/mL respectively (p<0.05). In the FRAP assay, the concentrations required to achieve an absorbance of 0.5 were 610.80±0.63 µg/mL for ferrous sulphate, 98.81±0.82 µg/mL for ascorbic acid, and 156.79±0.05 µg/mL for Trolox, whereas freeze-dried and spray-dried powders required 1393.33±0.42 µg/mL and 1450.87±0.52 µg/mL, respectively (p<0.05). *Amurthashtaka kwatha* demonstrated notable *in vitro* antioxidant activity, with the freeze-dried extract exhibiting greater effectiveness. Though less potent than that of standard antioxidants, the findings validate its traditional use and indicate its promise as a supportive natural antioxidant source.

Keywords: *Amurthashtaka kwatha*, Ayurveda, Freeze dry, Spray dry, Half maximal inhibitory

Personalized Platelet Rich Plasma (PRP) treatment for androgenetic alopecia: A comprehensive case study

R. M. C. D. Rathnayaka, M. S. F. Sapra

*Department of Unani Materia Medica, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka*

Androgenetic alopecia (AGA), a prevalent form of hair loss affecting both men and women, is marked by the progressive miniaturization of hair follicles. Platelet-Rich Plasma (PRP) therapy has emerged as a promising regenerative treatment for managing AGA. This case study examines the efficacy of a personalized PRP treatment protocol in a 27-year-old male patient with moderate AGA, classified as Norwood-Hamilton scale III-IV. The treatment involved microneedling-assisted application of PRP, prepared from the patient's autologous blood with a platelet concentration of 5x the baseline, administered over three sessions spaced four weeks apart. Outcomes were assessed using phototrichography analysis, scalp biopsy, and patient-reported satisfaction. Results showed a 42% increase in terminal hair density, with the mean hair shaft diameter improving from 0.04mm to 0.06mm. The patient reported a satisfaction score of 8.5/10, with no significant adverse events observed. Histological analysis revealed improved scalp vascularization and follicular activity, indicating enhanced follicular health. This study highlights the potential of personalized PRP therapy in improving hair density, thickness, and patient satisfaction in AGA management. While the findings underscore the efficacy of a tailored approach, limitations include the single-patient sample and the need for long-term studies to validate the results and establish standardized protocols. Personalized PRP therapy offers a promising, minimally invasive solution for AGA, warranting further exploration in broader clinical trials.

Keywords: *Androgenetic alopecia, Platelet-rich plasma, Hair restoration, Personalized medicine, Regenerative treatment*

Management of cerebral palsy through integration of physiotherapy with Ayurveda treatment: A case study

W. A. R. P. Weerasingha¹, S. M. Bhinde², I. A. M. Leena³, C. Chaglani²

¹*Gampaha Wickramarachchi University of Indigenous Medicine, Sri Lanka*

²*Department of Kaumarabhritya, Institute of Teaching and Research in Ayurveda, Gujarat, India*

³*Department of Ayurveda Surgery, ENT, Ophthalmology and Gynecology, Obstetrics and Pediatrics, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

Cerebral palsy is a permanent, non-progressive neuromotor disorder that affects the development of movement and posture, leading to limitations in physical activity and being a leading cause of childhood disability. The treatment of cerebral palsy requires a holistic, multidisciplinary approach that integrates various therapeutic modalities to optimize the patient's recovery and quality of life. Ayurveda treatment helps improve physical symptoms and cognitive functions; at the same time, physiotherapy plays a crucial role in enhancing motor skills, flexibility, and overall functional capabilities. This case study explores the integrated management of a 5-year-old female child diagnosed with spastic diplegic cerebral palsy, utilizing a combination of physiotherapy techniques and Ayurvedic treatment modalities. Assessment was done based on the modified Ashworth scale (MAS), Degree of muscle tone (MRC), Activity of daily living (ADL), Grading for motor milestones (CDC), and Gross motor function classification system (GMFCS). The child underwent a 100-day treatment regimen, which included an individualized physiotherapy plan that targeted specific impairments, as well as oral medicines and *Panchakarma* treatments such as *Udvarthna*, *Sarvanga abhyanga*, *Sarvanga nadi swedha*, *Prathimarsha nasya*, and *Yoga vasti* treatment. After the treatment, the patient showed an overall 15–20% improvement in the above-mentioned assessment criteria. The findings of this case study suggest that a combined approach of Ayurveda and physiotherapy positively impacts the management of cerebral palsy. Physiotherapy interventions may enhance motor rehabilitation in addition to the improvement typically achieved through Ayurveda treatment alone.

Keywords: *Cerebral palsy, Ayurveda, Physiotherapy, Childhood*

Quantitative analysis of total phenolic content, flavonoid and tannins in *Careya arborea* (Kahata)

A. P. A. Jayasiri¹, H. K. L. M. Senasinghe², S. N. I. Fernando³

¹*Department of Ayurveda Pharmacology, Pharmaceutics and Community Medicine, Faculty of
Indigenous Medicine, University of Colombo, Sri Lanka*

²*Institute of Chemistry Ceylon, Sri Lanka*

³*Department of Medical Microbiology and Immunology, Faculty of Medicine,
University of Colombo, Sri Lanka*

The plant species *Careya arborea* of family Lecythidaceae, known as “Kahata” or “wild guava”, is used in Ayurveda and traditional medical systems especially for orthopedic treatments in Sri Lanka. The plant contains important pharmacological compounds: tannins, saponins and flavonoids. Tannin is a phenolic plant compound that has attracted considerable attention for being the main source of antioxidants, that inhibits pathological conditions. These phytochemicals protect the body against oxidative damage from free radicals. These compounds have multiple biological activities, including anti-oxidant, anti-tumor, anti-inflammatory effects, due to their molecular structure. This study focused on quantifying these phytochemical groups. Methanol extract of the stem bark was subjected to analysis. Total phenolic content (TPC) and total flavonoid content (TFC) were determined by Folin Ciocalteu method with amount expressed as Gallic acid equivalent per gram of extract and Aluminium chloride method with amount expressed as mg quercetin equivalent per gram of extract respectively. Folin-Ciocalteu Assay method was used for tannin quantification in the sample extracts, calibrated against a standard tannic acid series, and the data were expressed as the mean $\pm$ SD (n = 3). Results of TPC was 571.3 ± 0.3 mg GAE/g of extract while TFC was 12.04 ± 0.29 mg QE/g of extract. Total tannins were 250.1 ± 1.2 mg TANE/g of extract. Results revealed high amounts of these chemical constituents that can induce biological activities helpful in therapeutic practices. Further experimental and clinical studies are recommended to confirm the efficacy.

Keywords: *Careya arborea*, Phenolic compounds, Tannins, Free radicals

Efficacy of Sri Lankan Ayurveda treatment on cases with recurrent adnexal simple cyst with endometriosis: A case study

B. S. Samarawickrama¹, Y. A. U. D. Karunarathne², K. P. K. R. Karunagoda²

¹Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka

²Department of Ayurveda Surgery, ENT, Ophthalmology and Gynecology, Obstetrics and Pediatrics, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka

Endometriosis is an unusual feature of retrograde menstruation that affects nearly every woman of reproductive age. Women with endometriosis are usually confronted with one or both of the two major problems: pain and infertility. This study was aimed to showcase the outcome of an observational case study on endometriosis managed by Sri Lankan Ayurveda treatment regimen. A 23-year-old unmarried girl with Body Mass Index of 21 kg/m², had a left-sided septate endometrioma (8.0 cm × 3.8 cm) diagnosed recently by trans abdominal scan. She complained of premenstrual lower abdominal and pelvic pain (Visual Analog Scale 09) 1 week before menstruation, with vomiting and increased pain with menstruation. In 2022, she had undergone laparoscopic cystectomy for right adnexal mass; 2.3 cm x 1.3 cm, with right salpingectomy. Her menstruation was regular with normal flow. In the Ayurveda Gynecology clinic, she was diagnosed as *Udavartha yoni vyapada*. With her consent, a 3 ½ month treatment protocol involving *Ama pachana*, *Agni deepana*, *Lekana*, and *Karshana* treatments were adopted orally; *Kasaya*, *Choorna*, *Guli*, *Thaila*, externally *Abhyanga*, *Sweda*, *Paththu*, *Pitchu*, and *Mathra basti*. The case was assessed every 2 weeks before introducing the new drug regimen for 3 months. The case was well tolerated with the management protocol, with blood pressure 120/80 mmHg, body mass index was 21 kg/m² and all other basic parameters remained intact. Her symptoms were reduced by 91% according to Endometriosis Health Profile-30 Scale, menstrual pain was controlled (Visual Analog Scale 0-2), and cyst disappeared at the final Trans abdominal scan report. After the 02-month follow-up period, the condition remained intact. The results of this case study provided an encouraging outcome for further studies on Sri Lankan Ayurveda treatment on Endometriosis and Ovarian cysts.

Keywords: Endometriosis, Simple cyst, Udavarta, Sri Lankan Ayurveda management

Effect of *Nasya karma* and *Karnapurana* in the management of *Karnanada* (Tinnitus): A case series study

L. D. S. Hansitha¹, R. H. S. K. De Silva², R. L. Y. U. Rathnayaka¹

¹Department of Ayurveda Surgery, ENT, Ophthalmology and Gynecology, Obstetrics and Pediatrics,
Faculty of Indigenous Medicine, University of Colombo, Sri Lanka

²Department of Ayurveda Medicine and Indigenous Medicine, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka

Karnanada is one among the twenty-eight *Karna roga* mentioned in the main Ayurveda source book of *Acharya Susritha* (Susruta Samhita), which correlated with Tinnitus in modern medicine. The general objective of this study was to evaluate the efficacy of an Ayurvedic intervention in the management of *Karnanada* (Tinnitus), with the specific objective of evaluating the efficacy of *Anu taila nasya* and *Bilva taila karnapurana* in the management of *Karnanada* (Tinnitus). This study was mainly designed as a case series. People seeking treatment for Tinnitus at Out Patient Department of *Shalakya* (ENT) clinic of Ayurveda National Hospital were recruited for the study. Five patients were treated for a period of two months and followed up for another one month. In the first week, *Shodhana nasya* with *Nirgundyadi taila* was done daily. In the second week, *Anu taila nasya* was done daily. *Karnapurana* was done for three weeks, with one week resting period after each *Karnapurana* for one week by using *Bilva Taila* according to reference of Ayurveda classical text book of Bhaishajya Ratnavali *Karnaroga chikitsa*. Assessment was done by using both objective criteria and subjective criteria. This research revealed the effectiveness of the treatment plan but differences were not statistically significant due to the small sample. Future studies with larger sample size and longer follow-up periods are recommended to confirm obtained results and explore the long-term effects of this Ayurvedic approach.

Keywords: *Karnanada, Karnapurana, Karnaroga, Nasya, Tinnitus*

Literary study of the external treatment modalities on *Dushta vrana* in practice

D. A. A. D. Arachchi¹, D. A. R. Sakunthala²

¹Ayurveda National Hospital, Borella, Sri Lanka

²Department of Ayurveda Surgery, ENT, Ophthalmology and Gynecology, Obstetrics and Pediatrics,
Faculty of Indigenous Medicine, University of Colombo, Sri Lanka

Dushta vrana in Ayurveda corresponds to chronic or non-healing wounds in modern medicine. It is characterized by necrotic tissues, excessive pus, *Dushita rakta srava*, foul odor, and a prolonged healing period, whereas modern medicine defines chronic wounds as those not healing within 30 days. This study aimed to scientifically compile the pharmacodynamic and pharmacological properties of external treatment modalities in current practice. Thirty external treatment modalities on *Dushta vrana* in practice were collected from the Ayurvedic and traditional practitioners who are working in selected Government hospitals and private sector by using individual discussion method. Data related to pharmacodynamic and pharmacological properties were collected from authentic Ayurvedic books and analysis was done by percentage-based statistical method. Analysis of pharmacodynamic properties revealed that most predominant rasa was *Madura* (50%), *Tikta* (50%), and *Katu* (42.30%). The leading *Guna* were *Snigdha* (61.53%) and *Laghu* (42.30%), while both *Ushna* and *Sheeta veerya* were equally represented (50%). Most common *Vipaka* was *Katu* (61.53%). Regarding pharmacological actions, primary *Dosha karma* was *Vata-Kapha shamana* (30.76%) and *Pitta vruddhikara* (26.39%). The prominent *Guna karma* included *Krimighna* (34.61%), *Vrana shodhana*, *Lekhana*, and *Vishaghna* (each 15.38%). These pharmacodynamic and pharmacological properties play a crucial role in converting *Dushta vrana* into *Shuddha vrana*, subsequently into *Ruhyamana vrana*, aligning with progressive stages of wound healing. Particularly, the action of *Vrana shodhana* supports to promoting sterile environment conducive to healing. In conclusion, these external treatment modalities identified significant efficacy in management of *Dushta vrana* by supporting wound cleansing, reducing inflammation, enhancing tissue regeneration through their distinct Ayurvedic pharmacodynamic and pharmacological actions.

Keywords: *Dushta vrana*, *Vrana shodhana*, *Krimighna*, *Kaphashamana*

Therapeutic effect of Yoga in the management of Hypertension: A case series

S. N. L. Narathota, Y. S. G. Wimalasiri

*Department of Ayurveda Pharmacology, Pharmaceutics and Community Medicine,
Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

Yoga is a multifaceted spiritual discipline that promotes health and well-being by the union of body, mind and soul. Its components commonly applied for therapeutic benefits include *Asanas* (physical postures), *Pranayama* (regulated breathing), and meditation. Hypertension is a major risk factor for coronary artery disease and cerebrovascular accidents. Yoga holds a notable place in the non-pharmacological management of Hypertension. An observational study was conducted for one month at the Yoga clinic of Rural Ayurveda Hospital, Kesbewa, to evaluate the therapeutic effect of selected Yoga practices on reducing systolic and diastolic blood pressure in female patients with chronic hypertension undergoing conventional antihypertensive treatment. After obtaining consent, ten female patients aged between 45 and 55 years with chronic Hypertension on medication, and without any joint disorders, were selected. In the study, *Sukhasana* (Easy Pose), *Nadishadhana-Pranayama* (breathing exercises) and *Shavasana* (Corpse Pose) were utilized. The methods of practicing the above-mentioned *Asanas* were demonstrated, and the patients were advised to practice them in morning from 9-10 am for 01 hour, spending 20 minutes on each *Asana*, and to attend the clinic every Saturday for 04 weeks for clinical examination and blood pressure (BP) monitoring. BP readings were recorded before and after the intervention. The results showed a reduction in both systolic and diastolic BP across all participants. The mean BP before the intervention was 140/90 mmHg, which decreased to 130/80 mmHg following the 01-month Yoga regimen. These findings suggest that Yoga may offer a beneficial adjunct to conventional Hypertension management. Further studies with a larger sample size and controlled conditions, such as participants practicing Yoga without concurrent Antihypertensive medications can be recommended to strengthen the evidence base.

Keywords: *Yoga, Hypertension, Sukhasana, Nadishodhana, Pranayama, Shavasana*

A study on the association of food habits and childhood obesity in school children of ages 6-14 in Sudharma College, Magalle, Galle in Southern Province

A. D. W. I. G. Yatawara¹, I. A. M. Leena², M. W. S. J. Kumari²

¹District Ayurveda Hospital, Galle, Sri Lanka

²Department of Ayurveda Surgery, ENT, Ophthalmology and Gynecology, Obstetrics and Pediatrics, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka

Childhood obesity is a rising public health concern globally and in Sri Lanka, contributing to various health complications. Poor dietary habits, including frequent consumption of energy-dense, processed, and sugary foods, are key contributors to obesity in school-aged children. This study investigates the prevalence of childhood obesity and its association with dietary habits among 6-14-year-old school children attending Sudharma College, Galle, Southern Province. A cross-sectional study was conducted among 508 school children, with Body Mass Index measurements used to determine obesity prevalence. Interviewer administered questionnaire assessed their dietary habits, meal frequency, snack consumption, and food preferences. Descriptive and inferential statistical methods were used to analyze the association between food habits and obesity. Ethical approval was obtained from Ethics Review Committee of the Faculty of Indigenous Medicine, University of Colombo (ERC 24/231). Written informed consent was obtained from parents/guardians and assent was taken from the children. The prevalence of obesity was 14.7% (n=75), with the highest rate among children aged 12-14 years (37.3%). Males showed a higher prevalence (65.3%) compared to females (34.7%). Key dietary behaviors contributing to obesity included daily consumption of sugary drinks (88%), fast food (68%), and processed foods (77.3%). Among obese children, 85.3% consumed snacks before meals, and 61.3% preferred processed foods over home-cooked meals. A significant proportion (61.3%) reported eating while watching television or using a device. Only 10.7% were aware of sugar content in snacks. Unhealthy dietary patterns are significantly associated with obesity in school-aged children. These findings emphasize the urgent need for targeted nutritional interventions; behavior change strategies and school-based programs to promote healthy eating and prevent childhood obesity in Sri Lanka.

Keywords: *Childhood obesity, Dietary habits, School children, Sugary drinks*

Synergetic effect of *Panchakarma* based treatment regimen for Parkinson's disease with special reference to *Kampa vata*: A case report

K. K. A. Nilani¹, E. D. T. P. Gunarathna²

¹Postgraduate Institute of Indigenous Medicine (PGIIM), University of Colombo, Sri Lanka

²Department of Kayachikitsa and Deshiya Chikitsa, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka

Parkinson's disease is a chronic, progressive neurodegenerative disorder affecting millions globally. In Ayurvedic literature, Parkinson's disease has clinical resemblance to *Kampa vata*, characterized by tremors, rigidity and bradykinesia. This case study aims to evaluate the efficacy of a *Panchakarma*-based treatment protocol described in *Cikitsa Sarasangraha*, an Ayurvedic text authored by Vangasena in 1276 A.D. A 47-year-old female patient diagnosed with *Kampa vata* presented to the Ayurveda National Hospital, Borella, with symptoms including tremors of the upper and lower limbs (*Karapadataala Kampa*), rigidity (*Stambha*), slowness of movement (*Chestasanga*) and postural instability (*Dehabramana*) persisting for three years. With informed consent, the patient underwent a 35-day *Panchakarma* treatment regimen. The protocol included: *Abhyanga* and *Swedana* with *Kshirabala taila* and *Dashamuladi nadi swda* for 7 days; *Yoga vasti* comprising *Kshirabala taila anuvasana vasti* and *Atmagupatadi niruha vasti* for 8 days; *Shirovasti* with *Kshirabala taila* for 7 days; and *Virechana karma* with 30 ml *Eranda taila* mixed with 60 ml *Triphala* decoction as the concluding therapy. The patient was assessed before and after the treatment using Hoehn and Yahr Scale and Parkinson's disease composite scale. The patient showed mild to moderate degree of improvement in the symptoms. Hoehn and Yahr Scale changed from stage 03 to stage 02 within 20 days and Parkinson's disease composite scale also showed some changes which tremor 66%, rigidity 66%, bradykinesia 66% and postural instability 66% were reduced. *Sarvanga abhyanga*, *Anuvasana vasti* and *Shirovasti* with *Kshirabala taila* helped in reducing stiffness of muscles and joints, providing analgesic effect, nourishment of *Sushka dhathu* and also doing *Vatahara* and *Vatanulomana* action with neuro protective action. This case study suggests that the *Panchakarma* therapies outlined in Vangasena Samhita offer a promising integrative approach for managing *Kampa vata* and its parallels with Parkinson's disease. Further clinical studies are needed to validate these findings and explore the broader therapeutic potential of Ayurvedic management in *Kampa vata*.

Keywords: *Panchakarma*, *Kampa vata*, Parkinson's disease, *Vatanulomana*

Objective assessment of *Manasika prakriti*; Integrating Ayurvedic theory with modern temperament research: A systematic literature review

I. G. P. R. Kulanatha¹, S. M. M. D. Keerthisingha², C. H. P. Hapuarachchi³

¹*Department of Basic Principles and Ayurveda Anatomy and Physiology, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

²*Department of Chemistry, Faculty of Science, University of Kelaniya, Sri Lanka*

³*Department of Electrical and Computer Engineering, The Open University of Sri Lanka*

Manasika prakriti in Ayurveda, based on three *Trigunas* (*Sattva*, *Rajas*, *Tamas*), offers a psychological constitution model aligning with modern temperament theories like the Big Five. This systematic literature review objectively assesses *Manasika prakriti* by integrating classical Ayurvedic theory with contemporary research, aiming to enhance mental health screening, support personalized interventions, and inform future cross-cultural research. Following PRISMA 2020 guidelines, classical Ayurvedic texts and indexed databases (PubMed, Scopus, Google Scholar) were searched for studies (2000-2024). Inclusion criteria focused on quantitative or psychometric data related to *Manasika prakriti*, *Triguna* theory, temperament traits, or personality disorders. After screening 161 records, 22 eligible studies were synthesized to compare Ayurvedic classifications with modern temperament models. The detailed study selection process is presented in the PRISMA flow diagram. The review identified 16 *Manasika prakriti* subtypes within *Satwika*, *Rajasika*, and *Tamasika* categories. Quantitative findings from diverse adult populations within the *Manasika prakriti* research paradigm showed category prevalence rates: *Satwika* (32–38%), *Rajasika* (40–45%), and *Tamasika* (17–23%). *Satwika* types demonstrated emotional stability and lower psychological distress, while *Rajasika* and *Tamasika* types exhibited higher distress ($p < 0.001$). Validated psychometric tools and physiological markers confirmed strong correlations between Ayurvedic classifications and modern temperament traits. This review demonstrates the feasibility and value of objectively assessing *Manasika prakriti*, integrating Ayurvedic and modern constructs, thereby enhancing personality and mental health understanding. Future research should address geographic bias and assessment tool heterogeneity for broader applicability.

Keywords: *Manasika prakriti*, *Triguna*, *Temperament*, *Personality disorders*, *Big five*

Therapeutic evaluation of a traditional Sri Lankan herbal oil in the management of diabetic foot ulcers: An observational study

K. W. Rasangika, N. D. N. Jayawardhane

*Department of Ayurveda Medicine and Indigenous Medicine, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka*

Diabetic foot ulcers represent a significant clinical challenge, frequently leading to infection, prolonged hospitalization, and potential limb amputation. Despite advancements in conventional medical therapies, chronic non-healing ulcers remain prevalent, necessitating alternative or complementary treatment approaches. This preliminary observational study evaluates the efficacy of a traditional Sri Lankan medicinal oil, as documented in the *Thalpathe Piliyam* (Volume 16), in promoting wound healing among Diabetic foot ulcers patients. Two patients diagnosed with lower limb ulcers of grades I and II were selected based on predefined inclusion and exclusion criteria. Eligible participants were aged 18–70 years, diagnosed with type 2 diabetes mellitus, and presenting with Diabetic foot ulcers which is not chronic more than six months. Patients with malignant or *Aramana* wounds or those suffering from hypertension, dyslipidemia or other major systemic disorders, were excluded. Following the wound cleansing with saline and *Panchavalkala kashaya*, the traditional oil was applied topically once daily over 9 to 28 days. Clinical outcomes were evaluated using a Visual Analogue Scale, assessing pain, exudate characteristics, odor, ulcer edge characteristics, and floor granulation. Informed written consent was obtained from both participants. Case 1 achieved complete healing within 9 days; Case 2 exhibited over 75% improvement in wound parameters by day 28. Phytochemical analysis of the oil revealed the presence of tannins, flavonoids, and alkaloids, which exhibit known anti-inflammatory, antimicrobial, and wound healing properties. These preliminary findings suggest that the traditional oil holds therapeutic potential for Diabetic foot ulcers treatment. Further controlled clinical studies are recommended to confirm its efficacy and safety profile for broader clinical application.

Keywords: *Diabetic foot ulcers, Traditional medicine, Madhumehajanya vrana, Herbal oil, Wound healing*

A Study on prevalence and influencing factors for junk food consumption among preschool children in Labuduwa Division

R. A. C. Lakmali¹, O. T. M. R. K. S. Kalawana², L. D. R. De Silva²

¹Department of Ayurveda, Galle, Sri Lanka

²Department of Ayurveda Surgery, ENT, Ophthalmology and Gynecology, Obstetrics and Pediatrics, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka

Increased junk-food consumption among all age groups is common, creating a public health challenge with global prevalence of around 70%. Preschool children are a vulnerable group for junk-food consumption related diseases. Majority of studies addressed adolescent and teenagers only. This study was conducted to explore the prevalence of junk-food consumption among pre-school children. Sixty-eight pre-school children and their parents in Labuduwa Grama Sevaka division, Poddala MOH area were selected to study the influencing factors and the knowledge and attitude on junk-food consumption. Accordingly, literature study was conducted with online and hand searching. A survey was commenced with the approval from ERCFIM and necessary authorities. Cross sectional data was collected from parents by interviewer-administered questionnaire and analyzed. Prevalence of the junk-food consumption was 90% in participants and 87% in family members. Both 56% of boys and 44% of girls were consuming junk-food. Chocolate and ice-cream were the mostly consumed junk-foods. Children started junk-food consumption after one year of age and positive correlation was observed with the age and consumption. Most children consume junk-food as snacks and as breakfast and dinner. Majority expend over Rs. 200.00 on junk-food daily. Of the children, 69% were healthy and 31% were ill. Asthma was frequently observed while overweight and allergic rhinitis were in equal frequencies. Commonest influencing factor for junk-food consumption was taste. Convenience and lack of time were the reasons given by parents for providing junk-food. Among the parents, 55% knew the nutritional content of junk food, 45% of parents knew the effect of junk-food on overall health. If affordable, 95% parents were willing to switch to healthy alternatives. Therefore, awareness programs were conducted at the Pre-schools to provide practicable solutions.

Keywords: *Junk-food, Pre-school children, Overweight, Health, Consume*

Morphometric study of the angle of inclination and angle of torsion of the humerus using digital imaging techniques

S. P. A. S. Nishan¹, B. Jat², R. Sharma², S. K. Yadav² and D. Choudhary²

¹*Department of Basic Principles, Ayurveda Anatomy and Physiology, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

²*Post Graduate Department of Rachana Sharir, National Institute of Ayurveda Deemed University Jaipur, Rajasthan, India*

The angle of inclination (AI) and humeral torsion angle (HTA) are critical morphometric parameters. AI determines glenohumeral joint alignment, while HTA affects the rotational orientation of the humeral head. These angles are essential for understanding upper limb function, asymmetry, and have significant clinical implications in prosthetic design, fracture fixation, and surgical planning. This study aimed to evaluate AI and HTA in adult human humeri using digital imaging techniques and assess the correlation between them. A total of 36 dry humeri (16 right-sided, 20 left-sided) from the National Institute of Ayurveda (NIA) osteological collection were analyzed without sex differentiation. Angles were measured using image analysis software. AI was defined as the angle between the humeral head and shaft axes, while HTA was the angle between the humeral head axis and bicondylar plane. The mean AI was $130.56^\circ \pm 3.46^\circ$ (range: 125° – 136°) in right humeri and $125.85^\circ \pm 4.09^\circ$ (range: 119° – 133°) in left humeri. The mean HTA was $64.06^\circ \pm 9.50^\circ$ (range: 50° – 80°) in right humeri and $64.10^\circ \pm 9.26^\circ$ (range: 49° – 82°) in left humeri. A statistically significant moderate negative correlation was found between AI and HTA in right humeri ($r = -0.61$, $p = 0.011$), while a weak, non-significant positive correlation was observed in left humeri ($r = 0.09$, $p = 0.704$). These results suggest potential functional or anatomical interdependence between the two angles in right-sided bones in an India -Rajasthan sample and reveals a statistically significant inverse relationship between the two angles on the right side, possibly linked to dominant limb usage, while asymmetry may reflect population-specific anatomical variation. Also, findings suggest a functional interdependence between AI and HTA in the dominant limb and highlight the need for further regional, sex-specific studies to enhance clinical and anatomical understanding.

Keywords: *Morphometric study, Angle of inclination, Angle of torsion, Humerus*

Ayurveda dietary and herbal interventions on gut microbiome modulation in metabolic disorders: A systematic review

K. G. D. Kothalawala¹, P. A. N. G. Perera²

¹*Faculty of Graduate Studies, University of Kelaniya, Sri Lanka*

²*Department of Ayurveda Pharmacology, Pharmaceutics and Community Medicine,
Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

The human gut microbiome has a significant impact on regulation of metabolism and linked to the pathogenesis of metabolic disorders such as obesity, Diabetes mellitus and dyslipidemia. As per the Ayurvedic principles, dietary and herbal interventions on gut microbiota have the potential to promote health and well-being. The increasing prevalence of metabolic disorders has emerged as a major challenge for healthcare systems worldwide. The aim of the study was to systematically evaluate the literature on Ayurvedic dietary and herbal approaches on gut microbiome modulation in metabolic disorders. A systematic search of online databases, PubMed, Google Scholar and ScienceDirect identified 1093 articles. Following PRISMA guidelines, title and abstract screening, and full text review were conducted and nine articles were eligible for inclusion. The reviewed studies indicated that herbs such as *Triphala*, *Curcuma longa* L., *Glycyrrhiza glabra* L., *Piper longum* L., *Zingiber officinale* Roscoe and *Piper nigrum* L. had a unique effect in modulating the composition and metabolism of the gut microbiome. These interventions promote gut microbiome homeostasis by enhancing beneficial microbes and inhibiting the growth of pathogenic species. Multiple studies suggest that the gut microbiome contributes in biotransformation of Ayurvedic dietary and herbal compounds and enhance the production of indole derivatives, urolithins and short-chain fatty acids (SCFAs) such as butyrate, acetate and propionate, which are crucial in reducing risk of metabolic disorders. This systematic review provides preliminary evidence for potential of Ayurvedic interventions in gut microbiome modulation in the management of metabolic disorders and emphasizes the necessity of further clinical validation.

Keywords: *Gut microbiome, PRISMA, Biotransformation, SCFA*

Evaluation of *in-vitro* glycemic regulatory and cholesterol lowering activity of two varieties of *Cinnamomum zeylanicum* Blume

L. N. L. Lekamge¹, W. J. A. B. N. Jayasuriya¹, S. D. Hapuarachchi², H. M. D. R. Herath¹

¹Department of Pharmacy and Pharmaceutical Sciences, Faculty of Allied Health Sciences,
University of Sri Jayewardenepura, Sri Lanka

²Department of Ayurveda Pharmacology and Pharmaceutics, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka

Cinnamomum zeylanicum Blume is a well-known medicinal plant and Sri Lanka has two main varieties as *Sri Gemunu* (SG) and *Sri Wijaya* (SW). Present study aimed to comparatively evaluate the *in-vitro* glycemic regulatory and cholesterol-lowering activity in leaves and barks of SG and SW varieties. Aqueous extracts of leaves of SG (SGL), leaves of SW (SWL), barks of SG (SGB), and barks of SW (SWB) were obtained and glycemic regulatory activity was evaluated by *in-vitro* alpha-amylase (AAM), alpha-glucosidase (AGU), anti-glycation (AGY) assays. Cholesterol-lowering activity was evaluated by Lieberman-Burchard method. IC₅₀ values for standard acarbose, SGL, SWL, SGB, and SWB in AAM assay were 0.08±0.00, 1.24±0.08, 1.13±0.05, 0.20±0.01, and 0.13±0.03 in mg/mL respectively while in AGU assay they were 186.70±4.38, 102.00±3.24, 96.68±3.14, 10.43±0.75, and 9.47±0.72 in µg/mL. Standard rutin, SGL, SWL, SGB, and SWB gave IC₅₀ of 250.4±4.35, 212.4±8.60, 187.5±1.63, 52.07±2.13 and 45.35±6.46 in µg/mL for AGY assay. IC₅₀ values of 17.75±2.23, 201.7±8.22, 175±7.00, 110.8±4.49 and 85.02±7.63 in µg/mL were given by standard atorvastatin, SGL, SWL, SGB, and SWB respectively for cholesterol-lowering assay. Leaves and barks have shown significantly higher glycemic regulatory activity (except in AAM) than the respective standards (p<0.05). Comparable glycemic regulatory and cholesterol-lowering activity (p>0.05) were shown among barks and among leaves (except in AGY) in the two varieties. Barks and leaves in the same variety have shown significant difference (p<0.05) in glycemic regulatory and cholesterol-lowering activity. It was concluded that both leaves and barks in *C. zeylanicum* varieties can be considered as potential glycemic regulatory and cholesterol-lowering natural agents. However, their potentials vary according to the variety.

Keywords: *Cinnamomum zeylanicum*, Leaves, Barks, Glycemic regulatory, Cholesterol-lowering

Unani perspective on *Qillat-E-Ifraz-E-Darqiyya* (Hypothyroidism): A comprehensive literature review

M. F. F. Fasmila¹, M. M. M. Nifras², A. M. Muthalib²

¹*Department of Unani Clinical Medicine, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka*

²*Department of Unani Materia Medica, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka*

Hypothyroidism is a clinical syndrome which is caused by thyroid hormone deficiency due to reduced production, deranged distribution, or lack of effects of thyroid hormone. The term *Qillat-e-Ifraz-e-Darqiyya* literally refers to the decreased secretions of the thyroid gland. The aim of this study is to review the concept of *Qillat-e-Ifraz-e-Darqiyya* (Hypothyroidism) and its management according to Unani system of medicine. A literature review was conducted across databases, including PubMed and Google Scholar, and Unani classical textbooks to identify relevant studies. Search terms such as ‘*Qillat-e-Ifraz-e-Darqiyya*’, ‘hypothyroidism’ combined with “Unani medicine”, ‘*Sue Mizaj*’ and ‘Management’ were used for articles published from 2014 to 2024. A total of 12 articles were filtered and scrutinized. Classical texts of Unani medicine have not described *Qillat-e-Ifraz-e-Darqiyya* (hypothyroidism) directly, but the clinical features resemble the symptoms and signs of *Sue Mizaj Barid* / *Sue Mizaj Balghami* (impaired cold temperament/ impaired phlegmatic temperament). The Unani system offers a comprehensive approach to its management by focusing on *Ilaj bil Ghiza* (Dietotherapy), *Ilaj bil Dawa* (Pharmacotherapy) and *Ilaj bil Tadbeer* (Regimental therapy), all while maintaining balance in the six essential factors of health (*Asbab-e-Sitta Zarooriya*). Herbal pharmacotherapy and specific compound formulations are also integral components of Unani treatment strategies. This review highlights the potential of Unani medicine in understanding and managing hypothyroidism, and it underscores the importance of conducting further clinical trials to evaluate the safety, efficacy, and applicability of these traditional interventions in contemporary healthcare.

Keywords: *Asbab-e-Sitta Zarooriya, Hypothyroidism, Sue Mizaj, Qillat-e-Ifraz-e-Darqiyya, Unani medicine*

Comparative pharmaceutical analysis of *Vajrakshara* (*Swethaparpati*) prepared using three variants of *Suryakshara*

S. M. K. S. Ranasinghe, U. R. S. R. K. Senarathne

*Department of Ayurveda Pharmacology, Pharmaceutics and Community Medicine,
Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

Vajrakshara (VK), a formulation mentioned in Bhaishajya Rathnavali, is cited in the Sri Lankan Ayurveda Pharmacopeia, mainly used in urinary disorders. Since VK is manufactured using various types of *Wedi lunu* (*Surya kshara* /KNO₃), this study aimed to evaluate pharmaceutical properties to ensure consistency and efficacy. VK1 is prepared with normal *Suryakshara*, while VK2 uses *Nirmalikirutha suryakshara*, followed by shodhana with half the hot water. VK3 is prepared using *Nirmalikirutha suryakshara*, followed by three *Bhavana* with *Ela hima* (cold extract of *Elettaria cardamomum*). The organoleptic characteristics of VK1 were crystal white flakes, a very soft texture, a strong odour, and a pronounced pungent taste. VK2 consisted of white, fragile flakes with a soft texture, a mild odour, and a pungent taste. VK3 was grayish coloured powdered flakes, slightly coarse, having a pleasant aroma and a gentle pungent taste. The moisture contents of VK1, VK2, and VK3 were 1.096%, 0.229%, and 0.698%, respectively. Their ash values were 58.92%, 80.45%, and 72.2%, while acid-insoluble ash levels were 0.19%, 0.29%, and 0.20%, and water-soluble ash values were 58%, 80%, and 72%. Alkaloids and tannins were detected only in VK3. The results revealed that VK1 has organic impurities, VK2 is highly inorganic, and VK3 is a compound formulation of organic and inorganic. Observations suggest that the sequential improvement in attributes is favorable for human use, with VK3 exhibiting the highest, followed by VK2 and VK1. Further investigations, including quantitative analyses and clinical trials are recommended to substantiate the safety and therapeutic efficacy of the formulations.

Keywords: *Vajrakshara*, *Shwetha parpati*, *Nirmalikirutha suryakshara*

Pharmacognostic evaluation of the leaves of *Atalantia ceylanica* (Arn.) Oliv.: An anatomical and microscopic approach

P. A. N. G. Perera, K. S. Hiripitiya, P. A. C. D. Veerasiri, B. P. Udani

*Department of Ayurveda Pharmacology, Pharmaceutics and Community Medicine,
Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

Atalantia ceylanica (Arn.) Oliv., which belongs to the Rutaceae family, is native to dry and intermediate zones of Sri Lanka and some regions of South India. The leaves of *Atalantia ceylanica* (Arn.) Oliv. has been traditionally used in folk medicine due to its presumed anti-inflammatory and antimicrobial properties. Despite its ethno-medicinal significance, systematically documented pharmacognostical characteristics remain limited. The objective of the current study is to establish comprehensive anatomical standards for the leaves of *A. ceylanica*, in order to assist the taxonomic authentication, crude drug identification and botanical quality control procedures. Leaves of *A. ceylanica* were examined for morphological and microscopic distinctive characters after authentication at the National Herbarium, Peradeniya. Microscopic evaluation was carried out using thin sections of fresh leaf samples and powdered dry leaves. Macroscopic examination revealed the leaf to be simple, alternate, coriaceous with an ovate to oblong lamina exhibiting reticulate venation and a characteristic citrus aroma. Microscopic analysis of transverse sections showed a dorsiventral leaf anatomy with a single-layered epidermis covered by a thin cuticle. The mesophyll consisted of elongated palisade parenchyma and spongy parenchyma, interspersed with numerous oil glands. The vascular bundle in the midrib region was surrounded by a parenchymatous bundle sheath. Stomata were predominantly parasitic and prismatic calcium oxalate crystals were distributed throughout the mesophyll. Powder microscopy revealed diagnostic elements including parasitic stomata, oil globules, starch granules, lignified fibers, crystal aggregates, simple and multicellular trichomes, etc. It was concluded that observed anatomical features provide reference standards for authentication and identification.

Keywords: *Atalantia ceylanica* (Arn.) Oliv., Pharmacognostical, Morphological, Microscopic

Potential of bitter taste as a therapeutic tool: Integrating Ayurveda principles with modern pharmacology

K. N. A. Dharmasena, N. D. Kodithuwakku

*Department of Ayurveda Pharmacology, Pharmaceutics and Community Medicine,
Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

Taste is a perception created on substance-receptor interactions. In Ayurveda, taste reflects significant post-digestive therapeutic properties including antipyretic, anti-adiposity, digestive, and detoxifying actions. Recent discoveries of extraoral taste receptors have provided scientific explanations for Ayurvedic taste concepts. However, the correlation of Ayurvedic principles with modern scientific findings remain limited. This study focused on elucidating the *Rogaghnata* (disease curing potency) and *Dosha kopata* (disease causing potency) of bitter tasting substances using novel research findings. Authentic Ayurveda books and scientific evidence published from 2015 - 2025 were retrieved from standard search engines using the words “bitter taste receptors”. After screening, 68 articles were selected out of 370 articles according to inclusion criteria. A comprehensive analysis was made to have the bottom line of this comparative study. According to Ayurveda, *Rasa* alone may assist in the causation of the diseases and its management. Activation of bitter taste in human occurs through 25 members of G protein-coupled receptors and the involvement of G α -gustducin transducer. There are many phytochemicals such as alkaloids, phenols, flavonoids, isoflavones, terpenes, and glucosinolates which have the ability to stimulate oral and extra-oral bitter taste receptors and initiate the T2R signaling cascades; for skin diseases G α 12/13/RhoA/ROCK/p38 MAP kinase/NF- κ B pathway of TAS2Rs, for airway obstruction diseases PLC and PKC intracellular signaling pathway of T2Rs, for metabolic disorders PLC pathway of TAS2R38 on enteroendocrine NCI-H716 cells etc. These extraoral T2Rs play a role in processes of modulating pathophysiology of various diseases. After a comprehensive analysis, the study was able to align the therapeutic actions of bitter taste in Ayurveda along with the sites of extraoral bitter taste receptors with their transducing pathways. These findings reveal a new therapeutic target to boost immune responses. However, it does not offer a comprehensive understanding of this ancient wisdom and may warrant in-depth knowledge on extraoral receptor mechanisms supported by comparative clinical studies.

Keywords: *Bitter taste, Extra-oral taste receptors, Rasa, Extraoral T2Rs*

Preliminary phytochemical screening, physicochemical analysis and chromatographic fingerprint of *Avalgujagajalindhaji lepa*

A. G. Samarawickrama¹, D. I. Uluwaduge², R. D. H. Kulathunga¹

¹*Department of Ayurveda Medicine and Indigenous Medicine, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

²*Department of Allied Science, Faculty of Medical Sciences, University of Sri Jayewardenepura, Sri Lanka*

Standardization is an important modern tool of analysis used to ensure the quality of herbal drugs. Analytical methods and standardization can ensure the quality and consistency of active ingredients in herbal medicinal formulations. *Avalgujagajalindhaji lepa* is a classical formulation mentioned in *Chakradatta* under *kushta adikariya*. *Avalgujagajalindhaji lepa* consist of three ingredients, viz., *Bakuchi* Seed (*Psoralea corylifolia*), elephant dung, and elephant urine. The present study was designed to perform the physicochemical and phytochemical standardization with HPTLC finger printing of *Avalgujagajalindhaji lepa* according to standard protocol. The *Lepa* was analyzed for its organoleptic, physicochemical features and screened for its phyto-constituents. *Avalgujagajalindhaji lepa* appeared dark brown, with a sharp odour and a semi solid rough nature. Physicochemical analysis of *Avalgujagajalindhaji lepa* showed water soluble ash 0.27 ± 0.02 % w/w, acid insoluble ash 0.14 ± 0.01 % w/w, and total ash content 4.43 ± 0.21 % w/w, pH of 6.51 ± 0.32 and loss on drying of 9 ± 0.05 %w/w at 105 °C. Ethanol extract of *Avalgujagajalindhaji lepa* exhibited the presence of various phyto-constituents, viz. alkaloids, carbohydrates, protein, phenols, steroids, saponins, tannins, and flavonoids. The HPTLC reveals clear, good separation of components and consistent fingerprint patterns for the ethanolic extract of *Avalgujagajalindhaji lepa*. The analytical data and HPTLC fingerprint profiles can be considered as viable parameters which would further help in the establishment of quality standards.

Keywords: *Avalgujagajalindhaji lepa*, *Kushta adhikariya*, *Chakradatta*, *Standardization*, *Physicochemical*

Evaluating the role of Ayurveda management in *Yuvana Pidaka* with special reference to *Acne vulgaris*: A case study

S. M. M. W. Kumari, R. L. Y. U. Rathnayake

*Department of Ayurveda Surgery, ENT, Ophthalmology and Gynecology, Obstetrics and Pediatrics,
Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

Acne vulgaris has been one of the most common problems of the young population. It has been described as *Shalmali* thorn like eruptions on the face due to vitiation of *Kapha*, *Vata* and *Rakta dosha* in Ayurveda. It can be correlated to *Yuvana pidaka* described under *Kshudra roga* in Ayurveda. The study was conducted to find out the role of Ayurveda management in *Yuvana pidika*. The major signs and symptoms were multiple acne with papules and pustule, itching, pain and blackish spots on face. A 16-year-old male patient having multiple acne with papules and pustules, itching, pain and blackish spots on face for the past 3 months presented at the OPD, Ayurveda Hospital Pallekele, Sri Lanka was enrolled in the study and consent was obtained and signs and symptoms were recorded. The investigations were done and data were collected based on available clinical facilities. The treatment regimen included internal medicines such as *Vasa guduchi kashaya*, *Manibadhra choorna*, *Kaishoora guggulu* followed by the *Lodhradi lepa* and *Raktha chandanadhi lepa* with *Pinda* oil application and *Pancha walkala pariseka sweda* on the face externally for 28 days. Reduction of the signs and symptoms were assessed using The Investigator's Global Assessment (IGA) Scale and Clinical Features Grading System. The patient had relief in all the sign and symptoms after 28 days of treatment with no new eruptions. Excellent improvement in The Investigator's Global Assessment (IGA) Scale was observed from grade 5 to 0. This case study demonstrates the effectiveness of Ayurveda in the management of *Yuvana pidaka*. In future, clinical trials should be planned with a larger sample size to generalize the findings.

Keywords: *Acne vulgaris*, *Yuvana pidaka*, *Lepa*, *Pariseka sweda*

An analytical review on the concept of *Dhatukshaya* and *Avarana* in the pathogenesis of *Madhumeha*

S. K. A. C. S. Senanayake

*Department of Ayurveda Medicine and Indigenous Medicine, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka*

Madhumeha, a subtype of *Vataja prameha*, is described in Ayurveda as a chronic and progressive metabolic disorder that parallels Type 2 Diabetes Mellitus (T2DM). According to the World Health Organization, over 422 million people globally are affected by T2DM, with nearly one in five adults in Sri Lanka being diabetic or pre-diabetic. Ayurvedic pathogenesis of *Madhumeha* is primarily attributed to two mechanisms: *Dhatukṣaya* (depletion of body tissues such as *medas*-fat, *Mamsa*-muscle, and *Ojas*-vital essence) and *Avaraṇa* (obstruction of *srotas*—bodily channels—by *Kapha*, *Medas* or *Mamsa*). Classical texts such as the *Caraka Samhita*, *Susruta Samhita*, and *Ashtanga Hridaya* describe these concepts, though their individual and interactive contributions to clinical practice remain under-analyzed. This review examines both Ayurvedic interpretations and biomedical parallels: *Avaraṇa* is comparable to insulin resistance and lipid-induced metabolic dysfunction, while *Dhatukṣaya* aligns with cellular degeneration and energy depletion observed in uncontrolled diabetes. The paper also discusses *Prameha* (a pre-diabetic condition) and its progression to *Madhumeha*, emphasizing factors such as diminished *ojas*, disturbed *doṣas*, and impaired *agni* (digestive/metabolic fire). The study highlights inconsistencies between classical and modern interpretations to support integrative diagnostics and therapeutic approaches. A model is proposed recognizing *Dhatukshaya* and *Avarana* as complementary pathological factors, guiding Ayurvedic treatment methods like *Apatarpana* (depleting therapies), *Brimhana* (nourishing therapies), and *Shodhana* (purificatory procedures). This integrated approach enhances understanding of *Madhumeha* and supports the development of personalized, collaborative management strategies between Ayurveda and biomedicine.

Keywords: *Madhumeha*, *Dhatukṣaya*, *Avaraṇa*, *Diabetes Mellitus*

A literature review on *Sulugulu Yavagu*: A historical perspective

P. S. R. Perera¹, K. P. K. R. Karunagoda²

¹*Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka*

²*Department of Ayurveda Surgery, ENT, Ophthalmology and Gynecology, Obstetrics and Pediatrics,
Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

Sulugulu yavagu preparation is specific due to its historical value, which is merged with religion, culture, and beliefs of Sri Lanka. This preparation is still in use but with limited scientific documentation. Hence, it was decided to collect and compile the historical data, and document it. This study also aims to collect historical evidence on *Sulugulu yavagu* preparation. Data were collected from traditional medical literature, Buddhist literature, and articles on Sri Lankan history which were written in both Sinhala and English. This *Yavagu* preparation has been mentioned in several books, such as *Sadhdharmalankaraya*, *Swadesheeya Bhaisajja Vishvakoshaya*, *Kandhata Upan* Thurulatha, *Talpate Piliyam*-volume 21, and several Sri Lankan ancient Ola leaves. The name for the preparation “*Sulugulu*”, relates to historical tales in Buddhism. According to the literature, this has been used in the Kurunegala District of the Northwestern Province of Sri Lanka. According to literature, this recipe was used in Sri Lanka by 2nd century BC, and two recipes of the preparation were revealed, with minor changes of the ingredients. A total of 11 herbal ingredients are included in the recipe named as *Ekadasha yavagu*. Other than ghee, all others are plant-based ingredients available in the country. The preparation method was almost the same in the recipes found. Data indicate that this dietary preparation contains medicinal value for abdominal pains. The results of this study show *Sulugulu yavagu* is an ancient traditional Sri Lankan preparation with important health benefits.

Keywords: *Sulugulu yavagu, Historical value, Recipe*

Effectiveness of *Satavar* (*Asparagus racemosus*) in the management of postmenopausal symptoms: A systematic review

M. N. F. Naazneen, A. M. Muthalib

*Department of Unani Clinical Medicine, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka*

Postmenopausal symptoms such as mood swings, vaginal dryness, loss of libido, hot flashes, and sleep disturbances result from hormonal changes during the later stages of life in women. Hormone Replacement Therapy remains the primary management strategy, though its side effects necessitate the search for safer alternatives. *Satavar*, also known as *Shatavari* in Ayurveda and long recognized in Unani medicine, has conventionally been used as a reproductive tonic, particularly for menstrual irregularities, infertility, and menopausal symptoms. Its benefits are extensively attributed to its phytoestrogenic property. This systematic review evaluates the clinical significance of *Asparagus racemosus* in managing postmenopausal symptoms. A systematic literature search from 2000 to 2025 was conducted using PubMed, ScienceDirect, and Google Scholar databases with key terms including “*Satavar*,” “*Asparagus racemosus*,” “postmenopausal,” and “menopause.” Clinical studies involving postmenopausal women treated with *Asparagus racemosus* were included. PRISMA guidelines were followed for screening, data extraction, and analysis. Out of 47 articles screened, 9 met the inclusion criteria. Most of the studies demonstrated a reduction in the occurrence and severity of vasomotor symptoms with the use of this tonic, particularly hot flashes and sweating; improvements in sleep, skin, and hair quality; alleviation of vaginal dryness and loss of libido; increased bone turnover markers; suppression of osteoclastic activity; and reduction of nervousness and anxiety, thereby enhancing overall quality of life. Improvements in serum estradiol and progesterone levels were also reported. No serious adverse effects were reported. Preliminary evidence indicates that *Asparagus racemosus* is a safe and effective supplement for managing postmenopausal symptoms. Nevertheless, further extensive clinical studies are necessary to confirm its efficacy, safety, and mode of action.

Keywords: *Satavar*, *Asparagus racemosus*, Post menopause

A pharmacognostical standardization of *Justicia adhatoda* Linn (Acanthaceae) used in Ayurveda and traditional medicinal system of Sri Lanka

J. M. Dahanayake¹, P. K. Perera¹, P. Galappaththy², L. D. A. M. Arawwawala³

¹Department of Ayurveda Pharmacology, Pharmaceutics and Community Medicine,
Faculty of Indigenous Medicine, University of Colombo, Sri Lanka

²Faculty of Medicine, University of Colombo, Sri Lanka

³Industrial Technology Institute, Malabe, Sri Lanka

Justicia adhatoda Linn. (Acanthaceae), commonly known as *Adathoda* in Sri Lanka (*Vasa* in Sanskrit), is a medicinal plant widely used in Ayurveda and traditional medicine in Sri Lanka for its respiratory benefits. It is well known for its expectorant and anti-asthmatic properties, helping to relieve coughs, colds, bronchitis, and asthma. Hence in this study an attempt was made to standardize the whole plant parts (*Panchangaya*) of *Justicia adhatoda* based on different parameters. To achieve this objective, pharmacognostical, physico-chemical, and phytochemical studies were conducted according to the guidelines mentioned in World Health Organization and Ayurveda Pharmacopea of India for herbal drug standardization. Macroscopical and microscopical characteristics of leaves, roots and stems of *Justicia adhatoda* plant were comparable with the features mentioned in Ayurveda Pharmacopea of India. Physico-chemical tests were done collectively for the *Panchangaya* and results revealed acceptable total ash ($2.74 \% \pm 0.0$), water-soluble ash ($1.6 \% \pm 0.05$), acid-insoluble ash ($1.6 \% \pm 0.05$), moisture ($6.06 \% \pm 0.16$) and foreign matter (1.2%) levels. Hot water extractive values ($8.5\% \pm 0.1$) were the same as cold-water extractive value ($8.5\% \pm 0.1$), Cold methanol extractive values ($5.4\% \pm 0.2$) were lower than hot methanol extractive values ($7.3\% \pm 0.1$). Heavy metals were analyzed via ICP-MS and results revealed Pb (0.18) and Hg (0.09) were in permissible limits and not detected for As and Cd for the *Panchangaya*. Phytochemical screening confirmed the presence of Saponins, phenols, tannins, terpenoids, steroids, flavonoids and cardiac glycosides. HPTLC profiles presented clear and consistent fingerprint patterns for methanolic extract of *Justicia adhatoda* leaves, roots and stems with the Chloroform: Methanol: Cyclohexane- 4.5: 0.7: 2.5 solvent system. These findings may contribute significantly to the identification and standardization of crude drugs, which are essential steps in ensuring quality assurance in the production of herbal medicines.

Keywords: *Justicia adhatoda*, Ayurveda, Traditional medicine, Standardization

Development and standardization of Ayurveda natural hair pack for hair growth and scalp health

L. Prakatheeswaran¹, P. K. Perera², J. M. Dahanayake²

¹*Mangalapathy Ayurveda Pvt Ltd, 29-5/4, Rohini Road, Colombo 06, Sri Lanka*

²*Department of Ayurveda Pharmacology, Pharmaceutics and Community Medicine, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

Ayurveda alternatives are becoming more popular as a result of growing health issues about the hair and scalp, brought on by chemical-based hair products. However, the reliability and broad acceptance of Ayurveda compositions are restricted by the absence of scientific standardization. This study aimed to develop and standardize an Ayurveda natural hair pack using ingredients known for their hair-strengthening properties, such as *Shikakai* pod (*Acacia concinna*), *Amla* fruit (*Emblica officinalis*), Fenugreek seed (*Trigonella foenum-graecum*), Hibiscus flower (*Hibiscus rosa-sinensis*), Bael fruit (*Aegle marmelos*), and Citrus peel. These ingredients were preprocessed, including cleaning, drying in the shade for 7-10 days to preserve the phytochemical properties and powdered. Next, they were mixed in a specific proportion as determined through trial formulations and traditional Ayurvedic references. Thin Layer Chromatography (TLC) fingerprinting, microbiological safety evaluation, heavy metal analysis, pH analysis and moisture content evaluation were used to optimize and test the formulation. The findings verified a pH of 3.5 that is suitable for the scalp, lack of artificial colouring and adherence to heavy metal and microbiological safety regulations. In terms of ingredient safety and purity, the Ayurveda hair pack fared better than commercial treatments. This study proves that Ayurveda hair formulations are consistent when they are standardized and scientifically tested. The study concluded that standardized Ayurveda formulation can provide effective and scientifically validated alternatives to synthetic hair care products in the market.

Keywords: *Herbal hair pack, Standardization, Thin Layer Chromatography, pH analysis, Scalp health*

Comparative pharmacognostical, phytochemical and chromatographical analysis of *Sharivadvaya*

P. A. C. D. Veerasiri, N. D. Kodithuwakku, K. N. A. Dharmasena

Department of Ayurveda Pharmacology, Pharmaceutics and Community Medicine, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka

“*Sariva*” is a commonly used medicinal plant in the treatment of fever, dysentery, and skin diseases. Two varieties of *Sariva*; *Krishna sariva* (KS) (*Ichnocarpus frutescens*, family Apocynaceae) and *Sveta sariva* (SS) (*Hemidesmus indicus*, family Asclepiadaceae) are mentioned in Ayurvedic texts. These two are often substituted for each other in the market for therapeutic purposes due to the similar morphological features of their roots, which are the main parts used medicinally. Despite their classification under different plant families, some *Nighantus* describe both plants having comparable *Rasadi pancaka* (Pharmacodynamic properties) and different pharmacological actions. This study aims to compare both botanical sources regarding their pharmacognostical, phytochemical and chromatographical properties. Authenticated plant samples were compared based on microscopic characteristics, phytochemical profiles, and chromatographic analysis. Unicellular trichomes, starch grains and cortical parenchymal cells were found in microscopic views of dry powder of both plants. KS showed rhomboidal calcium oxalate crystals, while SS showed resinous blocks along with fragments of pitted vessels. Ash values were 5.025 % and 4.020% and loss of drying values were 6.68% and 5.78% for KS and SS respectively. Alkaloids, flavonoids, terpenoids, saponins, and tannins were screened from the ethanol extracts of both plants. Chromatographic profiling at 366 nm using a mobile phase of toluene: ethyl acetate: formic acid (8:2:0.1) with vanillin as the standard revealed a few common peaks in SS (Rf values; 0.23, 0.18, 0.11) and KS (Rf values; 0.25, 0.19, 0.06, 0.78) with highest peak area for vanillin found in SS compared to KS (SS: KS, 1078.7:1710.3). These findings confirm that *Krishna sariva* and *Sveta sariva* exhibit some similarities in pharmacognostical properties, and phytochemical characteristics showed that they are histologically and chemically distinct. Quantification of bioactive constituents and the structural identification of active ingredients would provide deeper insights into the potency and efficacy of each variety.

Keywords: *Krishna sariva*, *Ichnocarpus frutescens*, *Sveta sariva*, *Hemidesmus indicus*

Development and standardization of *Parijata* (*Nyctanthes arbortristis* L.) flower based novel herbal tea as a potential functional beverage for diabetes mellitus (*Madhumeha*)

S. M. Palathiratne, J. M. Dahanayake, P. A. N. G. Perera

Department of Ayurveda Pharmacology, Pharmaceutics and Community Medicine, Faculty of Indigenous Medicine, Faculty of Indigenous Medicine, Sri Lanka

Diabetes mellitus is a common, impactful, non-communicable disease with increasing global prevalence. The objective of this research was to develop and standardize *Parijata* flower-based novel herbal tea as a potential functional beverage for diabetes mellitus. After extensive literature study and tea tasting, the herbal tea blend was developed as 40% *Parijata* (*Nyctanthes arbor-tristis* L.) flowers, 30% *Bilva* (*Aegle marmelos* (L.) Corrêa) flowers and 30% green tea (*Camellia sinensis* (L.) Kuntze), based on experimental optimization. All the above ingredients facilitate anti-diabetic action, as per classical Ayurvedic texts or modern scientific research. Ingredients were collected, authenticated and systematically processed using the cut and dry method to manufacture herbal tea sachet packets of 2.5 grams each, with appropriate packaging and labeling. Standardization of the final product was conducted in triplicate with organoleptic, physicochemical and phytochemical assays and chromatographic profiles, following WHO guidelines. The herbal tea brew is of golden-brown color, aromatic odor, mild bitter & astringent taste and soft texture. The physicochemical parameters: pH, moisture content and ash values were within acceptable ranges. Phytochemical analysis of aqueous extract revealed the presence of alkaloids, phenols, tannins, flavonoids, terpenoids, cardiac glycosides and saponins suggesting potential health benefits including anti-diabetic activity, while proteins and lipids were absent. The HPTLC fingerprint exhibited four characteristic peaks, indicating the presence of four active ingredients. Total phenolic content of 247 mg GAE/g, total flavonoid content of 35.62 mg QE/g and total tannin content of 76.6 mg TAE/g validate the anti-oxidant properties of the final product. In conclusion, these parameters can be used as benchmarking standards for this novel product and the herbal tea can be hypothesized to be a potential functional beverage for diabetes mellitus.

Keywords: *Diabetes mellitus, Functional beverage, Herbal tea, Madhumeha, Parijata*

Ayurveda and traditional treatment regime for *Greeva sandhigathavata*: A case report

D. K. P. P. Dissanayake¹, R. D. H. Kulathunga²

¹Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka

²Department of Ayurveda Medicine and Indigenous Medicine, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka

Greeva sandhigatha vata, correlating with cervical spondylosis, is caused by *vata dosha*. This study evaluates the effectiveness of Ayurveda and traditional treatment regime on *GSV*. A 48-year-old male patient presented with neck pain, and pain radiating along both upper limbs as well as along the posterior side of the head, accompanied by heaviness and numbness in both upper limbs, and limitation of the neck movements due to pain for the past 08 years. He was reported to the OPD in Ayurveda National Hospital, Rajagiriya. The treatment included *Mee oil Sneha*, *Wal embarella pottali sweda*, *Greeva vasti* with *Mee oil*, *Prathimarsha nasya* by *Anu thaila* and *Rasna sapthaka kashaya*. Modifications in the patient's life style after treatment; 90% *Shula* relief was observed. Cervical movements improved significantly (measured by the Goniometer); Left lateral movements from 50° to 70°, Right lateral movement from 65° to 75°, Flexion from 40° to 55°, Extension from 40° to 58°. *Mee oil Sneha* and *Greeva vasti* with *Mee oil* pacifies *Vata* and *Pitta* and also *Mee oil* has anti-inflammatory, anti-oxidant, analgesic, hepatoprotective, anti-cancer, anti-ulcer, anti-tumor, neuro-pharmacological properties. *Wal embarella pottali sweda* promotes *Snehana*, *Swedana* and *Vata kapha shamana*; *Prathimarsha nasya* balances *Urdhavajathrugatha kapha dosha*. *Rasna sapthaka kashaya* has *Thiktha* (35.7%), *Madura* (28.5%), *Katu* (21.4%), *Kashaya* (14.2%) *rasa*, *Lagu* (27.7%), *Snigdha* (22.2%), *Theekshana* (16.6%) *guna*, *Ushna* (71.4%), *Sheetha* (28.5%) *Veerya*, *Madhura* (57.1%), *Katu* (42.8%) *Vipaka*. In view of the above, this treatment regime demonstrated the effectiveness in this specific case of *Greeva sandhigatha vata* and warrants further investigation.

Keywords: *Ayurveda*, *Greeva sandhi gatha vatha*, *Mee oil*, *Prathimarsha nasya*

***Lagenaria siceraria* (bottle gourd) as a functional food: A systematic review of its nutritional composition, bioactive constituents, and therapeutic potential**

F. A. Jamaldeen¹, N. D. Kodithuwakku², A. P. A. Jayasiri²

¹Central Ayurvedic Dispensary, Alayadivembu, Sri Lanka

²Department of Ayurveda Pharmacology, Pharmaceuticals and Community Medicine, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka

Lagenaria siceraria (bottle gourd) is a widely cultivated vegetable known for its nutritional and medicinal value. Recent research highlights its potential as a functional food due to its rich phytochemical profile and therapeutic properties. This systematic review focuses on the nutritional content, bioactive compounds, and health benefits of *L. siceraria*, with its potential applicability in functional food development. The systematic review was conducted following PRISMA guidelines across electronic databases including PubMed, Scopus and Google Scholar from 2020 to 2025, using predefined search terms related to *Lagenaria siceraria* and functional food. Inclusion criteria encompassed original research articles, in vitro, in vivo, and human studies that focused on nutritional composition, bioactive constituents, and health benefits. A total of 280 articles were found, and after screening 25 articles were selected for the study. Nutritionally, besides 17 different amino acids, *L. siceraria* contains moisture, protein, fat, carbohydrate, fibre, ash, and energy in approximate amounts of 94.5±0.06; 1.2±0.06; 0.2±0.02; 3.75±0.03; 0.7±0.01; 0.5±0.01; 15±0.12 %, respectively, and vitamin C (10–12 mg/100g), potassium (170–210 mg/100g), ascorbic acid, β-carotene, and choline. Phytochemically, it contains flavonoids, saponins, terpenoids, cucurbitacins B, D, G, H, flavone-C glycosides, sterols such as fucosterol and campesterol, and the ribosome-inactivating protein lagenin. Pharmacologically, DPPH scavenging: 52%–87%, anti-inflammatory, diuretic, cardioprotective, hepatoprotective (up to 65% restoration in CCl₄-induced liver damage), purgative, antihyperlipidemic, and antidiabetic effects (30–55% reduction in blood glucose in diabetic models). It contains high choline levels, metabolic/metabolites precursors desirable for the functions of the brain, as well as amino acids, vitamins, and minerals that help in synthesizing neurotransmitters with neuroprotective benefits. Traditionally, it has been used to manage jaundice, ulcers, diabetes, epilepsy, and hypertension. Given its diverse bioactive profile, *L. siceraria* demonstrates strong potential as a functional food. Further clinical validation and standardization are needed to support its dietary integration.

Keywords: *Lagenaria siceraria*, Bottle gourd, Functional food, Phytochemicals

Nutritional values and medicinal applications of *Sharbat-E-Sazoori*: A review

M. N. F. Rizniya, M. S. M. Nasmeeer, M. R. M. Rifae, M. M. F. Thasneem

*Department of Unani Materia Medica, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka*

Dieto-therapy (*Ilaj bil Ghiza*) is the foundational component of treatment in the Unani system of medicine. There are numerous compound formulations that serve dual functions as both nourishment and medication. *Sharbat-e-Sazoori* is one such traditional nutritive syrup recognized for its therapeutic properties. This formulation is from classical handwritten Unani manuscripts and, despite its long-standing use, remains underexplored in scientific literature. The present study aims to comprehensively review the nutritional profile and pharmacological effects of *Sharbat-e-Sazoori* using both Unani texts and contemporary scientific papers (n=32), from the data bases Google Scholar, Semantic Scholar, and PubMed. The literature search included synonyms of the eight herbal constituents in combination with terms such as "nutritive value," "pharmacological action," and "medicinal uses." The active ingredients of *Sharbat-e-Sazoori* include *Centella asiatica*, *Mucuna pruriens*, *Hemidesmus indicus*, *Withania somnifera*, *Asparagus racemosus*, *Glycyrrhiza glabra*, *Curculigo orchoides*, and *Ipomoea mauritiana*. All the ingredients are rich in micronutrients like iron, zinc, calcium, vitamin A, C and B complexes. *C. orchoides* and *I. mauritiana* provide the required carbohydrates (~60%) and dietary fiber. They contain a diverse array of bioactive compounds such as flavonoids, tannins, alkaloids, and essential oils. Collectively, these constituents exhibit pharmacological properties including nervine tonic effects, cognitive enhancement, aphrodisiac action, rejuvenation, immune modulation, and stamina enhancement. *Sharbat-e-Sazoori* has been prescribed by Unani practitioners for conditions such as general debility, anaemia, sexual dysfunction, and cognitive decline. In conclusion, the review of nutritional data supports its role as a dietary supplement in deficiency disorders, while the documented bioactive constituents substantiate its traditional medicinal applications in various health conditions.

Keywords: *Food cum medicine, Immune booster, Nervine tonic, Nutritional values, Sharbat-e-Sazoori*

Evaluate the efficacy of the Ayurveda treatment regime in the management of *Kitibha kushta* with special reference to psoriasis: Case series

R. A. J. W. Rajapaksha, N. D. N. Jayawardhana, K. R. Weerasekara

*Department of Ayurveda Medicine and Indigenous Medicine, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka*

Kitibha is classified as one among a *Kshudra kushtha* in Ayurveda texts and it can be correlated with psoriasis in modern medicine. Ayurveda literature describes numerous treatment modalities for this disease and specially indicates the *Panchakarma* therapies according to the involvement of predominant *Dosha*. Therefore, this study was conducted to evaluate the efficacy of Ayurveda treatment regime for *Kitibha kushta* with the involvement of *Pitta dosha*. After obtaining ethical clearance, a total of five patients diagnosed with *Kitibha* were selected from the *Kayachikitsa* ward of Minneriya Ayurveda Base Hospital and the *Kayachikitsa* and *Panchakarma* wards of the Ayurveda National Hospital, Borella, Sri Lanka. The treatment regime included initially *Tripal guggul* decoction with *Manibadra churna*, followed by the *Grita pana* in *Vardhamana krama* until the presence of *Samyag snigdha lakshana*. After the administration of *Purva karma* (applied *Pinda thaila* and *Nadisveda* with *Dasamul kwatha*), *Virechana karma* was done with *Trivrut dantyadi* decoction. Assessment was done using the Psoriasis Area and Severity Index (PASI) scores before and after the treatment. Patients were observed over a period of one month. The response to the treatment was recorded as percentage as per the following calculation: (Before treatment - after treatment)/before treatment) x 100. After the treatment regime, all patients showed symptomatic improvement, as evidenced by reductions in PASI scores, reflecting decreased skin involvement and reduced severity of erythema, induration, and desquamation. One patient showed a marked reduction of 77.8%, while two patients demonstrated moderate improvements of 58% and 55%. Two patients exhibited mild improvements of 33.3% and 18%. The results of this case series suggest that the Ayurveda intervention including *Virechana karma* shows promising efficacy in the management of *Kitibha kushata* (psoriasis) with predominant involvement of *Pitta dosha*. However, randomized controlled studies with larger sample sizes and longer follow-up durations are necessary to validate these findings and explore the underlying mechanisms from both Ayurvedic and biomedical perspectives.

Keywords: *Kitibha, Psoriasis, Virechana karma, Trivrut danthyadi decoction*

Anti-inflammatory and hypolipidemic properties of an Ayurvedic polyherbal formulation and its raw materials

K. D. C. Madhushika^{1,2}, S. D. Hapuarachchi¹, T. S. Suresh³, P. K. Perera¹,
N. D. Kodithuwakku¹, J. M. Dahanayake¹, L. A. D. M. Arawwawala⁴

¹*Department of Ayurveda Pharmacology, Pharmaceutics and Community Medicine, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

²*Faculty of Graduate Studies, University of Sri Jayewardenepura, Sri Lanka*

³*Faculty of Medicine, University of Sri Jayewardenepura, Sri Lanka*

⁴*Herbal Technology Section, Industrial Technology Institute, Sri Lanka*

Scientific validation of pharmacological properties of Ayurvedic polyherbal formulations (APF) may facilitate the discovery of plant-based therapeutics for managing chronic systemic diseases. This study was designed to evaluate the *in-vitro* anti-inflammatory and hypolipidemic activities of APF and its component plant materials. It was prepared according to traditional methods by boiling 20.00 g from each raw material, *Sida alnifolia* - whole plant (SA), *Aegle marmelos* - root bark (AM) and *Zingiber officinale* -rhizome (ZO) with water (1920 mL) and further concentrating to obtain the hot aqueous extract (240 mL). The individual raw materials were also separately extracted in the same manner. All the aqueous extracts were freeze-dried to obtain the powder form. In vitro anti-inflammatory and hypolipidemic activities were assessed using the egg albumin denaturation and Liebermann–Burchard methods, with diclofenac and atorvastatin as the standards, respectively. APF, along with SA, AM, and ZO, exhibited notable anti-inflammatory activity, in the concentration range of 0.5 mg/mL to 10.0 mg/mL. All extracts showed dose-dependent hypolipidemic activity, with IC₅₀ values ranging from 59.29 ± 0.42 µg/mL to 291.19 ± 5.83 µg/mL; APF, SA, AM, and ZO recorded IC₅₀ of 59.29 ± 0.42 µg/mL, 291.19 ± 5.83 µg/mL, and 67.86 ± 6.04 µg/mL, respectively, versus atorvastatin (17.32 ± 0.15 µg/mL). Qualitative phytochemical screening of SA, AM, and ZO aqueous extracts revealed the presence of flavonoids, alkaloids, steroids, tannins, and phenol. Therefore, it could be assumed that the anti-inflammatory and hypolipidemic activity of APF may be due to the numerous phytochemicals present in its raw materials.

Keywords: *Hypolipidemic, Anti-inflammatory, Sida alnifolia, Aegle marmelos, Zingiber officinale*

Effect of *Nasya karma* with Ayurveda treatment regimen in the management of *Avabhahuka* with special reference to frozen shoulder: Case series study

T. Rajapakse, R. H. S. K. De Silva

*Department of Ayurveda Medicine and Indigenous Medicine, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka*

Frozen shoulder (Adhesive Capsulitis) causes pain and reduced mobility, significantly impacting quality of life. Modern treatments often fall short, leading many to seek holistic Ayurvedic care. Ayurveda emphasizes individualized therapies like *Panchakarma*, *Nasya*, and herbal remedies. The research is conducted as case series. The subjective parameters were the *Shoola* (pain) and *Stabdha* (stiffness). These parameters were modified to objective parameters through Likert Scales ranging from 1 to 4. Five patients aged 59–66 with *Avabhahuka* (Frozen Shoulder) were selected and treated at two Ayurveda hospitals in Sri Lanka. Patients were selected based on Ayurvedic diagnostic criteria and assessed through pain, stiffness, and range of motion. Treatment included internal and external therapies such as decoctions, herbal formulations, *Balakoranda* oil, and *Nasya karma* using *Dashamooli bala masha* decoction. Outcomes were measured over six weeks through clinical assessments, interviews and subsequently data entry through Likert Scales assigned to each parameter. Ethical approval was obtained, and no compensation was provided. During the data analysis, the subjective data were converted to numerical form using Likert Scales. Then the data were processed using SPSS computer software. The study supports the effectiveness of an Ayurvedic treatment regimen, offering a structured protocol for future clinical application and research. Among the five patients (80% female), aged 59–66, Ayurvedic treatment significantly reduced frozen shoulder pain and stiffness over time. Initial improvements were borderline significant, but long-term results showed meaningful relief ($p=0.04771$). Patients experienced enhanced mobility and comfort, with one exception due to strenuous physical activity. *Nasya Karma* with *Dashamoola bala masha* decoction and *Balakoranda* oil significantly reduced pain and stiffness in frozen shoulder, especially among middle-aged, *Vata-Kapha* females. *Nasya karma* with *Dashamoola bala masha* and *Balakoranda* oil shows promise for treating frozen shoulder, warranting further research to validate long-term effectiveness and lifestyle impacts.

Keywords: *Avabhahuka, Nasya karma, Balakoranda oil, Dashamooli bala masha decoction*

Amalgamation of artificial intelligence with Sri Lankan Ayurveda medicine: A comprehensive review

R. M. D. Jayathilake¹, K. P. K. R. Karunagoda¹, W. M. C. J. T. Kithulwatta²

¹*Department of Ayurveda Surgery, ENT, Ophthalmology and Gynecology, Obstetrics and Pediatrics,
Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

²*Faculty of Technological Studies, Uva Wellassa University of Sri Lanka*

In the modern era, Artificial Intelligence (AI) plays a major role in society. AI is integrated into the general medicine discipline for patient diagnosis, disease prediction, clinical data, etc. This review aimed to identify the current state of the amalgamation of AI with Sri Lankan Ayurveda Medicine. This study was led with several sub-research objectives to identify challenges, gaps, and strengths of the process of amalgamating AI with Ayurveda Medicine. For the study, twenty-five (25) scholarly articles were screened and selected from IEEE Xplore, Springer, Taylor & Francis, Elsevier (ScienceDirect), and other journal repositories by applying inclusion and exclusion criteria with *Artificial Intelligence* ^ *Ayurveda Medicine* *; **lexicographically related terms* as the search string in the search strategy. The initial screening was conducted by considering the title, abstract, and keywords of the article. The papers were finally selected by considering the full content of the scholarly article. These papers were published from the year 2019 – 2025 and have made investigations on AI-oriented mobile applications to assist patients with the support of other web and mobile technologies, including *APIs (Application Programme Interfaces)* in the Ayurvedic domain. Further, scholars have conducted several experiments to design and develop patient diagnosis and related platforms by using several Machine Learning and Deep Learning algorithms from supervised, unsupervised, and reinforcement learning with *Support Vector Machines (SVM)*, *Logistic Regression*, *K-Nearest Neighbors (KNN)*, *XGBoost*, *Convolutional Neural Networks (CNNs)*, *Decision Trees and Random Forests*, etc. in the Ayurvedic medicine domain. Further, studies have demonstrated big data analysis with data mining techniques. Furthermore, there was a trend to lead with *Natural Language Processing (NLP)* for enabling Ayurvedic chatbots as a revolutionized concept in the modern era. According to the existing scholarly articles, there is a positive direction for amalgamating modern AI with Ayurveda Medicine for sustainable development with contributing to human beings' wellness. Having a higher number of data records and the need for high-performance computing power is a critical challenge in the studied area. The overall review process report was submitted to three senior academics to ensure the validity and accuracy of the study. Overall, AI can be integrated with Ayurvedic Medicine with vast data sets to personalize treatments, predict diseases, and improve accuracy via pattern recognition for making a bridge with modern technology. Meanwhile, maintaining data privacy with the most sensitive data is a higher challenge in the current cyber world and modernization. The conducted research study projected the main gap, existing limitations, and strengths of the blended area of Ayurveda Medicine and AI, ensuring alignment with the research objectives.

Keywords: *Artificial Intelligence, Ayurveda, Deep Learning, Machine Learning*

***Hijama* therapy; A non-pharmacological intervention in health promotion and therapeutic management as adjuvant therapy: A review**

M. H. M. Nazeem¹, M. J. H. P. Sabra¹, M. I. Manuha²

¹*Department of Unani Clinical Medicine, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka*

²*Department of Unani Materia Medica, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka*

Hijama therapy, which is also called cupping therapy, has a long history. This is a non-pharmacological intervention and has been practiced by almost all the traditional medical systems including Unani Medicine in health promotion and to manage chronic and non-communicable diseases. The objectives of this review were to collect information and scrutinize the efficacy of cupping therapy scientifically and to popularize this simple intervention as adjuvant therapy in a wide range of diseases. Articles published from 2015 to 2025 were collected from various textbooks, journals and online data and scrutinized thoroughly. There are two types of cupping, namely dry and wet cupping. Dry cupping is a procedure where cups are fixed to the various sites of the body to create negative pressure in the cup to attract blood to the site. Wet cupping includes superficial and minor cuts on the skin surface and then cups are applied over the cuts to create negative pressure within the cups to allow the blood to ooze into the cups. This therapy acts as a detoxification process and triggers the immune system. The result reveals that there are considerable data available in relation to the efficacy of intervention of cupping therapy and its effects in health promotion and management of various chronic and non-communicable diseases such as musculoskeletal disorders, migraine, hypertension, metabolic syndrome and certain dermatological and respiratory ailments. In conclusion, the efficacy of cupping therapy should further be scrutinized scientifically and popularized in managing the various non-communicable diseases such as adjuvant therapy.

Keywords: *Adjuvant therapy, Hijama, Immune system, Therapy*

Evaluating the efficacy of *Balakoranda taila kati vasti* and *Kumburu etaadhi pinda sweda* in the management of *Katigraha* (Lumbar spondylosis)

G. Sanjida, A. G. Samarawickrama

*Department of Ayurveda Medicine and Indigenous Medicine, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka*

In today's world, humans suffer from many lifestyle-related disorders due to the adoption of modern lifestyles. *Katigraha* (Lumber spondylosis) is one such disorder, which is described as *Sthana vishesha vyadhi* in which the lumbar vertebra is mainly affected. The cardinal symptoms of *Katigraha* are *Ruk* (pain), *Stambha* (stiffness), and *Graha* (restricted movements). The main vitiated *Dosha* in *Katigraha* is *Vata*. Among the various types of treatment modalities mentioned in texts for *Katigraha*, *Kati vasti* and *Pinda sweda* are especially of use for physicians. Therefore, this study was designed to evaluate the efficacy of *Kati vasti* with *Balakoranda taila* mentioned in Ayurveda pharmacopoeia and fermentation with *Kumburu etaadhi pinda sweda* (guthli of gothyl *Calophyllum inophyllum* - *Domba ata mada*, oil of *Azadirachta indica* - *kohomba thel*, ghee, oil of *Madhuka indica* - *Mee thel*, castor oil, *Santalum album* - sandalwood, guthli of *Caesalpinia boundue* Roxb - *Kumburu ata mada*, seeds of *Gossypium herbaceum* - *Kapu ata*, leaves of *Curcuma longa*, seeds of *Mimusops elingi* Linn - *Muna mal ata* and sesame oil) prescribed by traditional physicians. Thirty patients, 30 - 70 years of age with *Kati graha* were selected for this study. Patients were diagnosed mainly by cardinal symptoms and with X-ray findings. The selected patients were treated with *Balakoranda taila kati vasti* and *Kumburu etaadhi pinda sweda* for a period of one month. Among the *Katigraha* patients, male patients were predominantly seen between ages of 41 - 50 years. In X-rays, presence of osteophytes were found in 37%. After the treatment period, all the symptoms were statistically significantly reduced and the mean initial pain (3.05 ± 0.29) was reduced to 0.98 ± 0.15 at the end of the treatment (41% reduction) ($p < 0.0243$). Mean initial stiffness (0.8 ± 0.16) was reduced to 0.47 ± 0.072 (49.85%) ($p < 0.0036$) and mean initial restricted movements (1.47 ± 0.23) was reduced to 0.72 ± 0.063 (reduced by 71.48%) ($p < 0.0231$). The present study provides insight into the use of external medicaments as better, effective medical measures for the treatment of *Katigraha*.

Keywords: *Katigraha*, *Ruk*, *Stambha*, *Graha*, *Kati basti*, *Pinda sweda*

Nutritional assessment of preschool children in the plantation areas, Baddegama and Nagoda in Southern Province, Sri Lanka

N. P. Wijesinghe¹, W. A. S. S. Weerakoon², D. P. A. Dissanayaka²

¹*Department Ayurveda, Southern Province, Sri Lanka*

²*Department of Ayurveda Surgery, ENT, Ophthalmology and Gynecology, Obstetrics and Pediatric, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

Nutrition plays a key role, especially in the first five years of a child's physical and mental development. The ages of 3-5 years are considered as preschoolers, and it is an exciting time for both parent and child. This study explores the prevalence of malnutrition among preschoolers in the plantation sector and their dietary practices and associated nutritional problems. In the modern era, most of the community in the plantation sector are Tamil. They have been isolated socio-economically, and the Tamil community showed the lowest educational levels, health, and nutrition conditions. As the preventive aspect is better than the curative aspect, paying more attention to the nutrition of the plantation sector is crucial. A sample of 68 students aged 3-5 years from PHDT-controlled preschools in Baddegama and Nagoda Medical Officer of Health areas participated in this study. After obtaining ethical approval, primary data collection was done by interviewing parents of children using a questionnaire and measuring children's weight, height, and mid-arm circumference to assess their current health status. Children's weight and height distribution were compared with those of normal healthy children. According to the Infant and Child Feeding Guidelines of Sri Lanka, 75.86% of children's weight and 43.1% of children's height were below the normal range for their ages. According to research findings, underweight was the most prominent malnutrition condition, with more than 2/3 of the estate population being underweight. The main focus of this study was to identify the prevalence of malnutrition and related nutritional problems early. The results show that skipping meals, avoiding nutritious foods and fruits, drinking too much coffee, and consuming instant and starchy foods directly affect the child's nutritional status. The most common causative factors identified for malnutrition and other nutritional problems among preschoolers are poverty, low literacy rate, a large number of family members, ethnicity, lack of food security, low economic status of parents, and wrong food habits. Thus, overall, there is a reduction in the growth of children in the Baddegama and Nagoda plantation areas of the Southern Province. Awareness programs and continued clinical assessment for preschool children and their parents will help overcome these health problems in the plantation areas.

Keywords: *Nutritional assessment, Plantation preschools, Malnutrition*

Role of *Imly* (*Tamarindus indica*) and *Zanjabeel* (*Zingiber officinale*) in the management of *shaqeeqa* (migraine): A comprehensive review

M. S. F. Sapra, E. M. G. K. N. Begum

*Department of Unani Materia Medica, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka*

Shaqeeqa (migraine) is a neurological disorder characterized by recurrent unilateral headaches, frequently accompanied by nausea, vomiting, and sensitivity to light and sound. In Unani medicine, *Shaqeeqa* is attributed to an imbalance in the brain's temperament (*Sue mizaj-e-dimagh*) and the buildup of morbid humors, which disrupt normal cerebral function. *Tamarindus indica* (*Imly*) and *Zingiber officinale* (*Zanjabeel*) are two classical Unani medicinal herbs traditionally used to correct temperament imbalances and alleviate symptoms of *Shaqeeqa*. This review aims to understand the role of *Imly* (tamarind) and *Zanjabeel* (ginger) in managing *Shaqeeqa* (migraine) by looking at both traditional Unani texts and modern scientific research. *Imly* is described as a cooling cerebral purgative, while *Zanjabeel* is regarded as a warming stimulant, particularly effective for headaches associated with cold temperaments. Contemporary research highlights the antioxidant, anti-inflammatory, and neuroprotective effects of both *Imly* and *Zanjabeel*. Clinical and experimental studies have demonstrated ginger's efficacy in reducing migraine frequency, duration, and severity, while tamarind's antioxidant properties and its role in gut-brain axis modulation suggest additional therapeutic potential. Although the findings are promising, there is still limited clinical evidence. More well-designed studies are needed to confirm the safety, effectiveness, and proper dosing of these herbs. Combining these traditional remedies with modern migraine treatments may provide affordable and culturally acceptable options for patients. This review underscores the need for collaborative research bridging traditional knowledge and modern science to develop effective, evidence-based interventions for *Shaqeeqa*.

Keywords: *Migraine, Unani medicine, Tamarindus, Ginger*

THE LIBRARY



Social Responsibility of Librarians: Leveraging Information for Sustainable Development

12th December 2025

MESSAGE FROM THE ACTING LIBRARIAN

Dr. P. K. S. Manatunga

*Acting Librarian
University of Colombo
Sri Lanka*



The International Library Research Symposium 2025, organized by the Library of the University of Colombo under the theme “Social Responsibility of Librarians: Leveraging Information for Sustainable Development”, serves as an important platform to explore the transformative role of libraries in advancing the United Nations Sustainable Development Goals (SDGs).

Today, libraries are not merely custodians of knowledge; they have become catalysts for change, bridging the digital divide, supporting quality education, promoting health literacy, preserving cultural heritage, and advancing equity, sustainability, social justice, and many more. In this context, the symposium highlights the vital responsibility of librarians to contribute meaningfully to social, economic, and environmental development.

The contributions presented here reflect a wide spectrum of innovative practices, critical reflections, and evidence-based research. Collectively, they illustrate how libraries and information professionals can shape inclusive knowledge ecosystems and foster sustainable futures.

I wish to extend my sincere gratitude to the authors, reviewers, editorial team, and organising committee for their scholarly and professional dedication, which has ensured the success of this symposium. Their efforts emphasize the continuing relevance of libraries as agents of sustainable development in Sri Lanka and beyond.

MESSAGE FROM THE SYMPOSIUM CHAIR

Dr. Pradeepa Wijetunge

*Librarian
University of Colombo
Sri Lanka*



The Annual Research Symposium of the Library is a significant component of the series of annual symposia of the University of Colombo, and this year, we selected the theme ***Social responsibility of the Librarians: Leveraging information for sustainability***. We strongly believe that the opportunity will generate a timely discourse on the social responsibility of the librarians, which is becoming increasingly significant with the numerous information-related challenges encountered by the community. In order to draw in research and expertise from external scholars, we designated this year's symposium as international.

I am grateful to our eminent Chief Guest, Vice-Chancellor of University of Colombo, Professor Indika Mahesh Karunathilake, and the two distinguished Keynote Speakers, Emeritus Professor Saroj Jayasinghe, retired senior academic of the university and Mr. Stephen Wyber, Director, External Affairs at the International Federation of Library Associations and Institutions (IFLA), Netherlands for gracing this occasion and their immensely inspirational and enlightening addresses. I am indebted to our panel of international and national invited speakers, Professor Md. Anwarul Islam (Bangladesh), Dr.(Mrs.) M. M. Mashroofa (Sri Lanka), Mrs. K. Yaakub (Malaysia), Dr. N. Suraweera (New Zealand), Ms. I. N. Sulasmi (Indonesia), and Mrs. V. Gangabadarachchi (Sri Lanka). I am also thankful to Professor D. L. Weerawarne, Chairperson of the ARS 2025, for his constructive guidance, and to all presenters, the paper reviewers and the session chairs. I am indebted to the Acting Librarian Dr. P. K. S. Manatunge, and all the academic staff of the library for their extensive support, and all the other library staff led by the SAR, Mr. K. A. C. P. Abeygunawardena, for their continuous dedication and commitment to the library.

MESSAGE FROM THE CONVENER

Mrs. S. Shabnam Johoran

*Senior Assistant Librarian
Main Library
University of Colombo
Sri Lanka*



It is with great pleasure and a deep sense of achievement that I warmly welcome you all to the International Library Research Symposium organized by the Library, University of Colombo. The theme of this year's symposium, "Social Responsibility of Librarians: Leveraging Information for Sustainable Development," is particularly timely and vital. In an era of rapid information change, librarians are more than mere custodians of knowledge; we are active contributors to societal progress. This symposium has provided a crucial platform for researchers to explore how our profession can effectively support a sustainable future, addressing challenges and seizing opportunities through the power of information.

Thank you to all the researchers, presenters, reviewers, attendees, library staff, and the organizing committee for making this International Research Symposium a great success. Your dedication and contributions are vital in shaping the future of our profession and its influence on sustainable development. As the convener, I am especially grateful to the Librarian, the Chair of the International Library Research Symposium 2025, for her committed effort and leadership. My deepest appreciation also goes to the University Annual Research Symposium Organizing Committee for their steadfast support and guidance.

This symposium will serve as a testament to our collective commitment to strengthening the role of libraries in advancing social responsibility and leveraging information for sustainability.

ORGANIZING COMMITTEE

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SYMPOSIUM PROGRAMME

Mode: Online (via Zoom)

Inaugural Session

9.00 – 9.10 am	National Anthem & Traditional Lighting of the Oil Lamp
9.10 – 9.15 am	Welcome Address by the Chair - ILRS 2025 <i>Dr. P. Wijetunge</i> <i>Librarian, University of Colombo</i>
9.15 – 9.25 am	Address by the Chief Guest <i>Professor Indika Mahesh Karunathilake</i> <i>Vice-Chancellor, University of Colombo</i>
9.25 – 9.30 am	Token of appreciation for the Chief Guest
9.30 – 9.35 am	Launch of the Electronic Proceedings
9.35 – 9.40 am	Introduction to the Keynote Speaker I
9.40 – 9.55 am	Keynote Address I <i>Emeritus Professor Saroj Jayasinghe</i> <i>Faculty of Medicine, University of Colombo</i>
9.55 – 10.00 am	Token of appreciation for the Keynote Speaker I
10.00 – 10.05 am	Introduction to the Keynote Speaker II
10.05 – 10.20 am	Keynote Address II <i>Mr. Stephen Wyber</i> <i>Director, External Affairs, IFLA Headquarters, Netherlands</i>
10.20 – 10.25 am	Token of appreciation for the Keynote Speaker II
10.25 – 10.30 am	Vote of Thanks by the Convener – ILRS 2025 <i>Mrs. S. Shabnam Johoran</i> <i>Senior Assistant Librarian, Main Library, University of Colombo</i>

Invited Speaker Session

10.30 – 10.45 am	Prof. Md. Anwarul Islam Professor, Department of Information Science and Library Management, University of Dhaka
10.45 – 11.00 am	Dr. M. M. Mashroofa Senior Assistant Librarian, South Eastern University of Sri Lanka
11.00 – 11.15 am	Mrs. Khairulbahiyah Yaakub Chief Librarian, University of Technology Malaysia (UTM), Malaysia
11.15 – 11.30 am	Dr. Namali Suraweera Academic Developer, Victoria University of Wellington, New Zealand
11.30 – 11.45 am	Ms. Indreswari Nurmalia Sulasmi Librarian, Center for Bibliography and Library Materials Processing, National Library of the Republic of Indonesia
11.45 – 12.00 noon	Mrs. Varuni Gangabadarachchi Chief Librarian, Colombo Public Library, Sri Lanka

Technical Session

12.00 – 01.30 p.m.	Technical Session I
01.30 – 03.00 p.m.	Technical Session II

INTRODUCTION TO THE KEYNOTE SPEAKER – I

Emeritus Professor Saroj Jayasinghe

*Faculty of Medicine
University of Colombo
Sri Lanka*



Saroj Jayasinghe, an Emeritus Professor of Medicine at the University of Colombo, was one of the longest-serving consultant physicians at the National Hospital of Sri Lanka. He holds three doctorates: an MD in a clinical discipline and two by thesis from the Universities of Bristol and Colombo.

He was the founding head of the Department of Medical Humanities, the first such department in Sri Lanka, and continues to lead a global initiative to establish Sri Lanka as a hub for introducing humanities into health professional education.

In relation to the Sustainable Development Goals (SDGs), he has been invited to the UN and the WHO to share his expertise. He pioneered the concept of Planetary Health in Sri Lanka by organizing the first symposium on the topic during the Colombo Medical Congress in 2020.

He has crossed disciplinary boundaries to address broader societal and environmental issues and was ranked among the world's top 2% of scientists in the Science-wide author databases of standardized citation indicators by Stanford University, USA. He has over 170 peer-reviewed publications, and his current research interests include the role of meditation in diabetes, medical device development, decolonizing medical education, and systems thinking in health.

ABSTRACT OF THE KEYNOTE ADDRESS – I

Libraries and the SDGs: Enhancing Collective Intelligence for Sustainable Development

Emeritus Professor Saroj Jayasinghe

Faculty of Medicine, University of Colombo, Sri Lanka

Libraries are agents for advancing the Sustainable Development Goals (SDGs), and have the capacity to serve as vital community hubs for information, education, and digital inclusion. This role is particularly significant in Sri Lanka, which faces challenges such as the urban-rural divide, varying levels of teaching languages (e.g. English), and recovery from a poly-crisis.

Libraries directly contribute to Quality Education (SDG 4) and foster various literacies; for instance, promoting health literacy positively impacts Good Health and Well-being (SDG 3). Furthermore, by enabling access to e-government services, livelihood information, and skills training, libraries support Decent Work and Economic Growth (SDG 8) and No Poverty (SDG 1). Their work in preserving local heritage and providing equitable access to knowledge also strengthens Peace, Justice, and Strong Institutions (SDG 16). Beyond sharing knowledge, libraries have a proactive role in promoting equity of access to knowledge (i.e Gender Equality (SDG 5) and as a role of sustainable practice, through practices such as green building design, resource sharing, and promoting environmental awareness within their communities (SDGs, 12 - Sustainable Consumption- and 13 -Climate Action).

A relatively novel role for libraries involves promoting collective intelligence to share knowledge, coordinate and thinking across the SDGs. Collective intelligence extends beyond information access to include deliberately widening networks, fostering dialogues, and harnessing the group intelligence that emerges from collaboration. To advance this paradigm, Sri Lankan libraries must address three critical gaps: digital, linguistic, and conceptual. Overcoming the digital gap requires providing affordable broadband, internet-enabled devices, and digital literacy training. The linguistic gap can be bridged by deploying AI-supported translation tools to make global knowledge accessible in local languages, similar to India's AI-led language policy. Finally, libraries can address the conceptual gap by popularizing Citizen Science, positioning themselves as focal points for collaborative problem definition, data collection, and analysis. This approach leverages distributed intelligence and crowdsourcing, empowering citizens to become active interpreters and sensors for local development, thereby fully realizing their potential as engines of collective intelligence for the SDGs.

INTRODUCTION TO THE KEYNOTE SPEAKER – II

Mr. Stephen Wyber

Director, External Affairs

*International Federation of Library Associations and Institutions
(IFLA) Headquarters*

The Hague

Netherlands



Stephen Wyber is the Director, External Affairs at the International Federation of Library Associations and Institutions (IFLA), the global organization for libraries of all types. In his role, Stephen works with colleagues to ensure that the potential of libraries to contribute to wider policy goals is recognized and to advocate for the legal and policy changes needed for them to realize their potential. In particular, he is involved in IFLA's work around sustainable development, both as an opportunity for libraries to build new connections and as a tool for reflecting on our own contribution to societal goals. Stephen has worked for IFLA since 2016, and previously held roles at the British Embassy in France and the UK Permanent Delegation to the OECD. He studied at the University of Wales, Aberystwyth, Sciences-Po Strasbourg and the College of Europe, Natolin.

ABSTRACT OF THE KEYNOTE ADDRESS – II

The Social Responsibility of Librarians: to Whom, How and When?

Mr. Stephen Wyber

Director, External Affairs

International Federation of Library Associations and Institutions (IFLA), Netherlands

Libraries pride themselves on their focus on service to their communities, in the here and now. This reflects the fundamental nature of libraries as part of the social contract that sees citizens ready to give up a share of their incomes in exchange for a service that they could not guarantee on their own. But we face change: in what we consider to be knowledge and how it is shared, in the technologies that enable access and use, in the economic environment that shapes our own resources, and in the political and social one that shapes the lives and needs of our communities.

To remain true to our age-old mission to serve through knowledge and information, we need to be ready to step back and look with fresh eyes at what delivering on the social contract means today. Business as usual – however well-meaning – risks leading to a situation where we are not doing what society, as individuals, as communities, today and into the future, want and need us to do. In this speech, we will explore different ideas around to whom we have responsibilities as libraries, and how we can work out how to fulfil these. In addition to the ongoing importance of establishing services and offers that meet individuals' needs, we will look at the place of libraries in the broader range of services provided by governments and para-governmental organisations to communities, using the United Nations 2030 Agenda as a framework. Finally, we will step further back still and explore how the concepts of sustainability and sustainable development imply a responsibility not just to our communities today, but also in the future, and how we can deliver on this most effectively. Through this intervention, we hope to provide frameworks for testing ideas and approaches against the need to fulfil our different responsibilities.

LIST OF ABSTRACTS

Bridging the digital divide of marginalized communities through digital inclusion initiatives: A narrative review <i>S. Alikhan</i>	490
Analysis of outreach engagement activities conducted by the officers in-charge of the public libraries in the Kalutara District, Sri Lanka and their alignment with SDGs <i>C. K. Gamage, K. K. N. L. Perera</i>	491
Outreach initiatives of academic libraries: A bibliometric analysis based on the Scopus database <i>S. S. Johoran</i>	492
Trends of online presence and Artificial Intelligence usage in scholarly publications: A case study based on the University of Colombo, Sri Lanka <i>N. M. Karannagoda, P. K. S. Manatunga, S. G. N. C. Senanayake</i>	493
Use of health literacy, health information literacy, and information literacy in research: An analysis of scholarly papers on higher education indexed in PubMed <i>K. K. N. L. Perera, K. I. D. F. Senanayake, D. C. Kuruppu</i>	494
Pattern identification of Sri Lanka presidential election results with special attention to voting literacy: 1982-2024 <i>P. M. Ayomi, W. P. G. L. Perera</i>	495
Adherence to green building standards in academic libraries: A qualitative study on sustainable library design and operations <i>T. Ramanan, S. G. N. C. Senanayake, N. M. Karannagoda</i>	496
Assessing blended learning satisfaction across academic years: A study of Social Sciences and Humanities undergraduates at a selected state university in Sri Lanka <i>R. B. S. S. Rathnamalala, P. K. S. Manatunga</i>	497
Assessing the role of LMS assessment tools in data-driven academic decisions: A case of the Faculty of Management Studies and Commerce in a selected state university in Sri Lanka <i>N. N. Sellaheewa, P. K. S. Manatunga</i>	498
Social science undergraduates' perceptions of generative Artificial Intelligence tools: A case study <i>M. A. L. Silva, S. M. Adhikari, M. A. Lankathilake, S. D. Somaratna</i>	499
Aligning university library practices with the United Nations Sustainable Development Goals: A case study <i>S. D. Somaratna, M. A. Lankathilake</i>	500

Community empowerment activities of public libraries in Jaffna District	
<i>T. Sritharan, L. Balakumaran, K. Chandrasekar</i>	501
Preserving students' subculture expressed through graffiti: A case study of University of Colombo Library	
<i>C. Wijesundara</i>	502

Bridging the digital divide of marginalized communities through digital inclusion initiatives: A narrative review

S. Alikhan^{1,2}

¹*The Library, University of Colombo, Sri Lanka*

²*Department of Library and Information Science, Faculty of Arts and Social Sciences,
University of Malaya, Malaysia*

Digital inclusion has emerged as a vital strategy for addressing social exclusion in an increasingly digitized world. However, marginalized communities continue to experience multiple layers of digital exclusions due to infrastructural deficits, socio-cultural constraints, and institutional shortcomings. Although numerous digital inclusion initiatives have been implemented globally, there remains a lack of comprehensive understanding regarding the specific communities targeted, the types of initiatives employed, and the long-term challenges to their sustainability. This narrative review aims to address these gaps through three key objectives: (a) to examine the profiles and geographic distribution of marginalized communities targeted by digital inclusion initiatives; (b) to identify the types of initiatives implemented and the nature of the organizations responsible; and (c) to explore the challenges that threaten the long-term sustainability of these initiatives. A narrative review was conducted using literature retrieved from Scopus and Web of Science, enabling a thematic synthesis of the existing literature. Eleven relevant studies were analyzed in depth. Findings reveal that digital inclusion efforts primarily target rural populations, ethnic minorities, indigenous groups, and low-income urban residents across sub-Saharan Africa, South Asia, Latin America, and Western countries. Telecentres emerged as the most commonly implemented initiative, particularly in rural areas, along with mobile internet and broadband adoption programmes. These initiatives are typically operated through partnerships among governments, NGOs, and private stakeholders. These initiatives have shown promise in improving digital access and literacy, particularly among rural women and indigenous populations, disadvantaged youth and ethnic minorities. However, their sustainability is undermined by persistent challenges such as inadequate infrastructure, affordability barriers, socio-cultural resistance, institutional inefficiencies, and privacy and safety concerns. Without context-sensitive, inclusive, and community-driven approaches, digital inclusion initiatives risk perpetuating the very inequalities they seek to overcome. This review underscores the need for more adaptable and localized strategies to ensure the long-term impact of digital inclusion on bridging the digital divide in marginalized settings.

Keywords: *Digital inclusion, Digital divide, Sustainability challenges, Marginalized communities*

Analysis of outreach engagement activities conducted by the officers in-charge of the public libraries in the Kalutara District, Sri Lanka and their alignment with SDGs

C. K. Gamage¹, K. K. N. L. Perera²

¹*Technology Library, Faculty of Technology, University of Colombo, Sri Lanka*

²*Medical Library, Faculty of Medicine, University of Colombo, Sri Lanka*

This study addresses the lack of evidence on outreach activities conducted by officers belonging to various designations, in charge of Public Libraries (PLs) in the Kalutara District of Sri Lanka. The specific objectives of the study were: (a) to examine the relationship between designations of officers in-charge of PLs and outreach activities, (b) to investigate the relationship between educational qualifications of such officers and outreach activities (c) to thematically analyse outreach activities (d) to identify those themes' alignment with the United Nations Sustainable Development Goals (SDGs). The study targeted the entire population of officers in the district (N = 64), and received 43 responses (response rate = 67%). These personnel acted as chief responsible officers across PLs having various resource levels. They (N=43) represented five designations: Library Assistants (N=19, 44.2%), Librarians - Grade III (N=15, 34.9%), Librarian Grade-II (N=4, 9.3%), Librarians Grade-I (N=3, 7.0%), and Field Labourers (N=2, 4.6%). A mixed-methods approach was employed for data analysis, using inferential statistics and thematic analysis. The results were: (01) No significant associations between designations and outreach activities ($\chi^2 = 3.77$, $p = 0.58$, $p > 0.05$) (02) No significant association between educational qualifications and outreach activities (χ^2 , $p = 0.927$, $p > 0.05$) (03) Thematic analysis identified six (06) outreach themes: *Reading & Literacy Promotion/ Health & Well-being/ Education, ICT & Skills Development/ Community & Cultural Engagement/ Environmental & Social Responsibility/ Recognition & Motivation*. (04) These themes are directly aligned with SDGs 4, 3, 11, 13, and 15, and indirectly with SDGs 8, 10, 11, and 12. Accordingly, outreach activities are not influenced by formal positions or educational qualifications of officers, suggesting a possible involvement of individual and institutional factors. The themes underscore the multifaceted role of outreach activities aligning with multiple SDGs. Policy makers should provide more resources and training opportunities for officers in charge of PLs to enhance SGD-oriented outreach activities, irrespective of their designations and educational qualifications.

Keywords: *Public librarians, Outreach engagement, SDG, Kalutara District, Sri Lanka*

Outreach initiatives of academic libraries: A bibliometric analysis based on the Scopus database

S. S. Johoran

The Library, University of Colombo, Sri Lanka

Organizations worldwide are increasingly realizing the value of functioning in a socially responsible manner. The International Standard ISO 26000 provides guidance on social responsibility for all types of organizations. Academic libraries, as service-oriented institutions, play a crucial role in community engagement and should emphasize outreach initiatives as a means of fulfilling their social responsibility. Despite their potential to impact communities positively, there is limited comprehensive knowledge on how outreach efforts are explored in scholarly research. This study aims to identify and analyze research trends related to outreach initiatives in academic libraries by mapping bibliometric patterns of publications indexed in the Scopus database. The specific objectives of the study include mapping the year-wise distribution of papers, examining the authorship patterns, determining the degree of author collaboration, identifying the author's contribution based on the country, and mapping keyword occurrences. "Outreach*" OR "Community Engagement" AND "Academic Libraries" OR "Academic Librarians" OR "University Libraries" OR "University Librarians", limited to article titles and keywords to ensure relevance. The search was performed without indicating a specific period. Publish or Perish Software was used to extract the research publications from the Scopus database. Microsoft Excel and VOS Viewer applications were used for data analysis and visualization. Following the PRISMA flowchart, 53 relevant research articles were selected for analysis. The first research article on outreach initiatives in academic libraries was published in 2000 in the Scopus database. The findings indicate from 2011 to 2017 has been the prominent period in research publications on outreach initiatives in academic libraries. Most articles were co-authored, reflecting a high degree of collaboration among researchers. The United States of America has been the most productive country in research on outreach initiatives in academic libraries. Commonly occurring keywords included "Academic Library", "Outreach", "Community Engagement", "Promotion", and "Opportunity". This bibliometric study offers valuable insights for researchers and practitioners interested in understanding the scholarly landscape of outreach efforts in academic libraries.

Keywords: *Outreach initiatives, Academic libraries, Bibliometrics, Scopus database*

Trends of online presence and Artificial Intelligence usage in scholarly publications: A case study based on the University of Colombo, Sri Lanka

N. M. Karannagoda, P. K. S. Manatunga, S. G. N. C. Senanayake

The Library, University of Colombo, Sri Lanka

The rapid growth of digital platforms and Artificial Intelligence (AI) is reshaping how scholarly communication is produced, shared, and evaluated. Academic conferences, a key channel for disseminating new knowledge, increasingly rely on institutional repositories and online platforms to make research outputs visible to a broader audience. At the same time, AI tools are becoming embedded in academic writing, raising opportunities and concerns. Against this backdrop, the present study investigates the trends in online availability of conference abstracts and examines the extent of AI usage in their preparation, drawing on five years of conference data from the University of Colombo (UOC). This study aimed to: (a) examine the trends in uploading research abstracts to online platforms and institutional repositories, and (b) explore the use of AI in abstract writing. Proceedings of the annual research conferences of the university from 2020 to 2024 were used as the primary dataset. A quantitative approach was adopted, with Turnitin (TII) employed to check online presence and to identify AI usage. One thousand six hundred ninety-five abstracts have been published across the five years, with the highest number published in 2020 (381) and the lowest in 2022 (285). Average online presence increased from 20.59% in 2020 to over 98% in 2021–2023, though it dropped to 55.07% in 2024, possibly due to an Institutional Repository (IR) malfunction, indicating that many abstracts were not uploaded to the IR or other platforms, limiting plagiarism detection through TII. Average AI usage in abstracts rose steadily, from 0.13% (2020) to 0.41% (2022), 4.44% (2023), and 14.24% (2024). Except for 2021, this reflects a growing reliance on AI tools in academic writing. The findings highlight the importance of increasing the presence of research outputs on academic platforms to detect plagiarism, which will also enhance global accessibility, improve citation rates, and strengthen both researcher h-indexes and university rankings. However, while wider visibility aids plagiarism detection, it does not fully safeguard copyright. The rising use of AI underscores the need for clear policies and training in ethical AI-assisted writing. Properly harnessed, AI can improve quality and support publication in high-impact journals, contributing to the university's academic integrity. Future studies could expand to other universities and publication types for comprehensive findings. The librarians are responsible for initiating and supporting policy development and implementation, as well as raising awareness of these aspects.

Keywords: *AI usage, Online presence, Plagiarism prevention, Scholarly publications, Sri Lanka, University of Colombo*

Use of health literacy, health information literacy, and information literacy in research: An analysis of scholarly papers on higher education indexed in PubMed

K. K. N. L. Perera¹, K. I. D. F. Senanayake², D. C. Kuruppu¹

¹Medical Library, Faculty of Medicine, University of Colombo, Sri Lanka

²Nursing Library, Faculty of Nursing, University of Colombo, Sri Lanka

This study explores how the terms *Health Literacy (HL)*, *Health Information Literacy (HIL)*, and *Information Literacy (IL)* are conceptualized in scholarly literature, related to higher education, and investigates their conceptual overlaps. Through a systematic literature search using the terms; HL, HIL and IL, a total of 202 scholarly papers indexed in PubMed were retrieved and studied. Quantitative data were analyzed using descriptive and inferential statistics, while qualitative data were thematically analyzed. In titles, the literacy concepts appeared as: HL=192 (95.1%); IL=8 (3.9%); HIL=2 (1.0%). Within the full text, the concepts appeared as: HL=195 (96.5%); HIL=86 (42.6%); IL=74 (36.6%). A conceptual overlap was identified in 116 (57.4%) papers, while in 86 (42.6%) papers, concepts were discussed in isolation. According to chi-square tests, papers basically focusing on HIL ($\chi^2 = 48.159, p < 0.001$) and IL ($\chi^2 = 45.998, p < 0.001$) showed a significant conceptual overlap among HL, HIL, and IL. However, papers basically focusing on HL ($\chi^2 = 0.000, p = 1.0$) showed no significant conceptual overlap. By thematically analyzing the fundamental nature of all studies, three major themes were extracted: (a) *Incorporation of HL, HIL, and IL into the higher education curriculum*, (b) *HL/IL/HIL represented in terms of Digital Literacy*, and (c) *Conceptual role of 'HL/IL/HIL for health awareness in university students*. Considering the methodologies, 89 (44.1%, SD ≈ 7.22) examined how HL/HIL/IL are linked to healthy habits: 77 (38.1%, SD ≈ 6.57) focused on measuring students' HL levels: 31 (15.3%, SD ≈ 3.29) explored how HL/HIL/IL relates to students' willingness to seek professional support for health concerns; 5 (2.5%, SD ≈ 2.21) focused on validating health literacy tools. Accordingly, HL is the dominant literacy term identified within the study sample, while HIL and IL were under-represented. Studies focusing on HIL and IL have adopted a multi-literacy perspective in their conceptual theories. Comparatively, HL is discussed in isolation. Limited focus on validating health literacy assessment tools was also a notable gap observed. It is recommended to adopt HIL as the most suitable concept for integrating HL and IL. Also, it is recommended that future research explore the health information-seeking behaviour of university students more, as it did not emerge as a separate theme.

Keywords: *Health Literacy (HL), Health Information Literacy (HIL), Information Literacy (IL), Higher education, research, PubMed*

Pattern identification of Sri Lanka presidential election results with special attention to voting literacy: 1982-2024

P. M. Ayomi¹, W. P. G. L. Perera²

¹*The Library, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

²*The Library, University of Colombo, Sri Lanka*

The study focused on Sri Lanka's presidential elections from 1982 to 2024 using a quantitative and longitudinal design to examine electoral trends over time. To analyze voting patterns in Sri Lanka, the study used data from the Election Commission to examine nine presidential elections across twenty-two districts. Microsoft Excel was used to analyse the data. All islands' data depicted that the voting percentage increased to 83.72% in 2019 from 81.52% in 2015 and 81.06% in 1982. The highest abstention rate in 1988 was 44.68%, compared to a turnout rate of 55.32%. Absentees fell from 20.54% in 2024 to 16.28% in 2019. In 2010, there were 99.03% valid votes and this dipped to 97.69% in 1999, with 2.31% being rejected. Further, the study analyzed voting patterns in Sri Lanka's most populated Western Province. According to the Western Province results, the lowest total voter turnout recorded was 70.53%, with the highest abstention rate at 29.47% in 1988. The highest voter turnout reached 83.65% and the lowest abstention rate was 16.35% in 2019. The year 2019 indicated the lowest percentage of valid votes at 97.53%, with the highest rejection rate at 2.47%. On the other hand, the highest percentage of valid votes was 98.98% in 1982, with the lowest rejection rate at 1.02%. There is anecdotal evidence that some people do not vote because they do not like the candidates, feel there is no one worth voting for, some are unaware of the importance of voting, cannot read or write, cannot understand a long or complex ballot paper, or even fear of coming out considering their safety. To identify, explore, and validate the socially held anecdotal opinions, there is a need to conduct qualitative research, emphasising the importance of qualitative studies and the social responsibility of public and community librarians to enhance voting literacy.

Keywords: *Presidential election, Voter turnout, Abstention, Voting pattern, Rejected ballot, Voting literacy, Sri Lanka*

Adherence to green building standards in academic libraries: A qualitative study on sustainable library design and operations

T. Ramanan, S. G. N. C. Senanayake, N. M. Karannagoda

The Library, University of Colombo, Sri Lanka

Green building standards are increasingly essential for creating sustainable commercial and residential atmosphere. Libraries, as key learning and information centers, are required to incorporate these standards into their design and operation. In Sri Lanka, most of the libraries were constructed without a strong focus on sustainability, resulting in limited green features such as energy efficiency, indoor environmental quality, and green landscaping. The high costs, lack of coordination, and technological challenges have restricted the green building practices in university libraries. This study aimed to (i) assess the current level of sustainability features in existing library buildings, (ii) explore the opinions of library professionals on adopting the UN's SDGs relevant to green building standards, and (iii) identify the challenges in embracing integral sustainable designs. This study employed qualitative research approach, including a literature review, document analysis, and semi-structured interviews with library professionals from selected universities who are involved in planning, management, and operations. The interview data were analyzed using thematic analysis to identify key patterns and themes related to green building practices and standards such as LEED, BREEAM and GreenSL. The findings indicated that most academic libraries in Sri Lanka have only a few basic sustainable features, with limited multipurpose spaces and a narrow scope for green building elements. Library professionals generally supported the adoption of green standards, mentioning potential benefits such as energy savings, improved user comfort, and more flexible learning spaces. However, challenges such as high construction and maintenance costs, lack of technical knowledge, limited policy support, and difficulties in modifying older buildings were identified as major barriers. The study suggests promoting awareness among university leaders, providing training for library staff, incorporating mandatory requirements in policies, and applying green adaptive reuse methods to existing buildings. Similarly, SDG and IFLA sustainability agenda help enhance the adoption of green building practices. Implementing these measures would help create environmentally responsible, cost-effective, and user-friendly library spaces that meet the future needs of students and staff in Sri Lankan universities.

Keywords: *Green library buildings, GreenSL, LEED Standards, BREEAM, Sustainable Development Goals*

Assessing blended learning satisfaction across academic years: A study of Social Sciences and Humanities undergraduates at a selected state university in Sri Lanka

R. B. S. S. Rathnamalala¹, P. K. S. Manatunga²

¹*Department of Information Technology, University of Kelaniya, Sri Lanka*

²*The Library, University of Colombo, Sri Lanka*

The evolution of online learning has introduced the Blended Learning (BL) model, which combines online and face-to-face learning. This study examines the BL satisfaction across three academic years of Social Sciences and Humanities (SSH) undergraduates at the selected state university. BL has been newly implemented among the SSH undergraduates in this university in 2022; however, knowledge of its impact on student satisfaction during the adoption and how it affects their learning is insufficient. Therefore, the objective of this study is to measure student satisfaction and identify the diverse needs of learners through blended learning. The study adopted a quantitative research approach with a survey strategy, utilizing a questionnaire as the primary data collection instrument. Stratified sampling technique was applied to select 403 students from a population of 2625 students. Data was analyzed using SPSS v.25. The overall level of satisfaction with BL among the respondents was moderate, with a mean satisfaction score of $M = 3.90$ ($SD = 0.52$). The study assessed the satisfaction level of undergraduates across different academic years and found no significant difference in satisfaction ($F(2) = 0.216, p = 0.806$), indicating that overall satisfaction with BL is consistent and moderate across the first, second, and third years. The results indicate a considerable preference for synchronous, structured platforms like Zoom (75.7%) and Learning Management Systems (60.7%). Poor internet connectivity was the main challenge across all years, followed by technical issues and time management issues highlighting the need for improved infrastructure and technical support to enhance BL experiences. In conclusion, the findings demonstrate that BL has been well accepted by the SSH undergraduates, with consistent satisfaction across years. Effective implementation of BL requires structured online platforms and assistance to improve learning opportunities and address digital imbalances. Future research should explore longitudinal designs to examine changes in satisfaction over time. The findings demonstrate how addressing digital inequalities and strengthening learning support services can help bridge the digital divide. In this way, BL aligns with the broader goal of ensuring equitable and sustainable education for all. Expanding the scope can provide a more comprehensive understanding of BL effectiveness across different academic contexts.

Keywords: *Blended Learning, Student engagement, Learning platforms, Learning resources*

Assessing the role of LMS assessment tools in data-driven academic decisions: A case of the Faculty of Management Studies and Commerce in a selected state university in Sri Lanka

N. N. Sellaheewa¹, P. K. S. Manatunga²

¹*Faculty of Graduate Studies, University of Colombo, Sri Lanka*

²*The Library, University of Colombo, Sri Lanka*

Learning Management Systems have transformed higher education, offering tools that facilitate instruction, assessment, and academic decision-making. This study investigates how LMS assessment tools, particularly those integrated into Moodle, are associated with academic decision-making at the Faculty of Management Studies and Commerce in a state university in Sri Lanka. Specifically, it explores how the faculty utilizes LMS tools, assignments, quizzes, lessons, choice, workshop, survey and feedback and how their perceived convenience, accessibility, simplicity, and benefits influence academic decisions such as curriculum development, student evaluation, and instructional improvement. The research employs a quantitative approach grounded in the Technology Acceptance Model, based on responses from 150 early-career academics. The study revealed that assignments, quizzes, and lessons were the most used LMS tools, while workshops and surveys were less utilized. Among the respondents, Temporary Assistant Lecturers (36%) and Probationary Lecturers (29.3%) represented the largest groups. Participants reported strong positive perceptions of the LMS assessment tools in terms of convenience, accessibility, simplicity, and benefits (mean > 4.4, SD < 1.00). Correlation analysis showed significant relationships with academic decision-making, notably simplicity ($r = 0.770$) and convenience ($r = 0.718$). The regression model was significant ($F = 44.364$, $p < 0.001$), explaining 73.8% of the variance (Adjusted $R^2 = 0.738$), with all predictors significant ($p < 0.01$). No multicollinearity issues were detected ($VIF < 2.7$). The findings underscore the need for targeted interventions to maximize the effectiveness of LMS tools in academic decision-making. Universities should implement regular training programmes to improve faculty proficiency in utilizing the full range of LMS features beyond commonly used tools like quizzes and assignments. Additionally, LMS platforms must be designed with a focus on simplicity and mobile responsiveness to encourage broader adoption and ease of use. At the policy level, academic administrators are encouraged to integrate LMS-generated data into routine decision-making processes, particularly for curriculum development and instructional improvements.

Keywords: *Academic, Decision-making, Assessment tools, LMS, Moodle*

Social science undergraduates' perceptions of generative Artificial Intelligence tools: A case study

M. A. L. Silva¹, S. M. Adhikari¹, M. A. Lankathilake², S. D. Somaratna²

¹*The Library, University of Colombo, Sri Lanka*

²*Science Library, Faculty of Science, University of Colombo, Sri Lanka*

The penetration of Artificial Intelligence (AI) is revolutionising the education landscape. To develop a sustainable framework for the use of AI in higher education, it is vital to identify the perception of undergraduates on AI tools. Although a few studies have examined the undergraduate use of AI for academic work in the Sri Lankan context, there is a gap in research in identifying social science undergraduates' perceptions. Therefore, this study aims to identify the types and purposes of using AI tools, determine undergraduate perception, and find out the relationships between user context and perception of use of AI tools. A survey was conducted with the undergraduates (n=3104) of the Faculty of Arts, University of Colombo, by using the stratified sampling technique based on the academic years with a sample size of 341. A questionnaire was administered to collect data, and 57.4% responded. Data were analysed using SPSS Version 22. Most respondents are between 20-24 years of age (94%), and 87% are females. Respondents use 14 different AI tools, with a majority using a free version of ChatGPT (94%). Most of the respondents (84%) use AI tools daily and smartphones were the preferred devices. Knowledge discovery (65%) is the main purpose of using AI tools, whereas creative work (42%) and assisting in assignments (42%) are the other key purposes. Only 51.2% of undergraduates were satisfied with the use of AI tools, while 38.6% have indicated neutral satisfaction. Ease of use was the main reason to use AI tools, whereas quick response, generation of new ideas and efficiency were the other reasons. Age has a significant relationship with user perception on creativity ($p = 0.023$) and new idea generation ($p = 0.021$). Furthermore, significant relationships were observed between the undergraduate perception with subject streams and the level of study. This study concludes that the social science undergraduates of the University of Colombo use different AI tools, and the majority are satisfied with using AI for academic activities. Higher education institutes should consider developing AI policies to align with the changing needs of the undergraduates in the contemporary education landscape.

Keywords: *Artificial Intelligence, Social science undergraduates, Higher education, Sri Lanka*

Aligning university library practices with the United Nations Sustainable Development Goals: A case study

S. D. Somaratna, M. A. Lankathilake

Science Library, Faculty of Science, University of Colombo, Sri Lanka

Today, academic libraries have progressively developed beyond their traditional roles to become vital enablers of sustainability, equity, and innovation within higher education institutions. Over the past decade, many scholars have aimed to align library practices with the United Nations Sustainable Development Goals (SDGs). However, in the Sri Lankan context, studies focusing on the SDGs in libraries are scattered and abstract. Therefore, this study aims to explore and map the sustainable library practices of the Science Faculty Library at the University of Colombo to the SDGs. This library operates as an academic blended library and was awarded the Green Building Certification in 2021. It serves approximately 4,000 students enrolled in the Faculty of Science, of whom 54% are female. Using a qualitative research approach, data were collected through document analysis, service audits, and direct observations. The mapping of library practices against the SDGs shows that they are directly or indirectly aligned with all 17 SDGs. The direct contributions include 13 goals, such as no poverty (SDG 1), good health and well-being (SDG 3), quality education (SDG 4), gender equality (SDG 5), clean water and sanitation (SDG 6), clean energy (SDG 7), decent work and economic growth (SDG 8), industry, innovation, and infrastructure (SDG 9), reduced inequalities (SDG 10), sustainable cities and communities (SDG 11), responsible consumption (SDG 12), climate action (SDG 13), and partnerships for the goals (SDG 17). Findings highlight the library's multifaceted impact, ranging from providing inclusive access to information to promoting mental well-being, sustainable infrastructure, and ethical academic practices. Notably, the library's certified green building design, utilisation of solar energy, and digital platforms support broader environmental and innovation objectives. Additionally, career guidance programmes and outreach activities address employability and lifelong learning. This research also demonstrates that academic libraries can serve as operational models of sustainability, effectively bridging educational missions with global development agendas. Furthermore, the study recommends incorporating SDG-aligned indicators into library strategic plans and expanding collaborative partnerships to enhance impact.

Keywords: *Sustainable Development Goals, SDGs, University libraries*

Community empowerment activities of public libraries in Jaffna District

T. Sritharan¹, L. Balakumaran², K. Chandrasekar²

¹*The Library, University of Colombo, Sri Lanka*

²*The Library, University of Jaffna, Sri Lanka*

Public libraries are community hubs that host a variety of programmes for all ages in the community. Outreach activities in public libraries are an important aspect of their goals to support the community. Therefore, the main aim of this study was to examine the nature, implementation, and challenges of outreach activities conducted by public libraries in the Jaffna District and propose strategies for enhancing their effectiveness in community engagement. There are 60 public libraries in Jaffna District and all were selected for this survey. The structured questionnaire was used as a study instrument. Forty libraries responded at the rate of 66.7%. Data were analyzed using SPSS. According to the results 36 libraries engaged in conducting outreach activities. A variety of activities are conducted, and among them school visits (n=34) predominate, followed by mobile library services (n=31) and competitions for students (n=31). The school students are the main target group for conducting outreach activities. In 42.5% of these public libraries, 2-3 staff members are involved in conducting the outreach activities, while 22.5% of the libraries mentioned that only one staff member is involved in conducting outreach activities. For 30 public libraries the local government is the major supporting body, and other supporting bodies are reader circle (n=22), library staff (n=22) and library advisory board (n=17). Among the participated libraries, 65% of the libraries accepted that outreach activities have an impact on community development. Three (03) libraries mentioned that they are not sure whether outreach activities have an impact on community development. The challenges faced by the libraries are financial restrictions, inadequate staff, lack of transport facilities, low public interest and no training. Very useful suggestions were made by the public libraries to enhance the quality of outreach activities. Based on the results, this study recommends that efforts be made to identify funding sources to support outreach activities, libraries should be manned with adequate human resources, transport facilities for these services should be provided by the respective local authorities, and training programmes for public librarians need to be organized with the support of national level library organizations and Higher Educational Institutions.

Keywords: *Community empowerment, Jaffna, Outreach activities, Public libraries*

Preserving students' subculture expressed through graffiti: A case study of University of Colombo Library

C. Wijesundara

The Library, University of Colombo, Sri Lanka

Graffiti is an expression of culture that goes back thousands of years. Graffiti has been created using various techniques in graphical or written forms in public spaces without any permission or approval. Even though graffiti is an informal form of art, it conveys a great deal of information related to a particular society and its people. However, graffiti can disappear over time, and therefore, it is crucial to preserve it. Sri Lankan universities contain graffiti made on walls and furniture by the students. This research focused on the graffiti at the Main Library, created by the students of the University of Colombo. The objectives of the study were to identify and document the different types of graffiti present in the Main Library, categorise them into themes, and analyse the underlying meanings and significance of these graffiti connected to the students' lives. The Main Library consists of more than 1500 graffiti, and this research utilised a convenience sample of 308 graffiti found at the Lending Section (5th Floor) of the Library. The graffiti were transcribed into an MS Excel document and each graffiti was photographed separately. The dataset was thematically categorised based on content analysis approach into; Poems (n=10, 3.2%), Sentences (n=15, 4.9%), Verses (n=111, 36%), and Songs (n=150, 49%). Each category was further divided into sub-themes (n=286) such as Love (n=121, 42.3%), Broken Heart (n=107, 37.4%), Life Reality (n=24, 8.4%), University Life (n=15, 5.2%), Friendship (n=6, 2%), Family (n=3, 1%), Loneliness (n=1, 0.3%), Library (n=3, 1%), and miscellaneous topics accounted for smaller proportions. Sub-themes *Love* and *Broken Heart* dominate the data set, making up to 80% of the graffiti analysed. The popular song lyrics used in the graffiti showcase the students' awareness of contemporary popular culture and how they can be used to express their emotions, relationship struggles, rejections, and desires. The sub-theme on Life Reality (8.4%) reflects the hardship of life, resilience, and the actuality of human life, adding some philosophical dimension to this research. A limited amount of graffiti on University Life (5.2%) reflects insights into students' academic pressure, university relationships, and thoughts on the university system. The findings suggest that the graffiti in the main library serves as a key resource that expresses the emotional outbursts among youth, heavily shaped by popular music and cultural narratives. While love remains central, the dynamics of university life and social realities highlight the role of graffiti as a bridge between personal experiences and collective ideas. This research will be expanded by documenting all the graffiti at the Main Library of the University of Colombo and analysing them comprehensively to derive deeper insights into the subculture of Sri Lankan university students, while enabling librarians to fulfil their social responsibility of preserving this unique form of art for future generations.

Keywords: *Graffiti, Sri Lanka, Students, Subculture, University of Colombo*

SRI PALEE CAMPUS



Transformations in Arts and Media in the Post-Global Era

31st October 2025

MESSAGE FROM THE RECTOR

Professor Prathiba Mahanamahewa

*Sri Palee Campus
University of Colombo
Sri Lanka*



It is with great pleasure that I extend my warm greetings and best wishes to all participants of the Annual International Research Symposium – 2025, held under the theme “Transformations in Arts and Media in the Post-Global Era.” This timely and thought-provoking academic forum, taking place today, 31 October 2025, at Sri Palee Campus, University of Colombo, Sri Lanka, brings together both local and international scholars and researchers to share their insights, experiences, and innovations across disciplines.

As a young and vibrant institution that celebrated its Silver Jubilee last year, Sri Palee Campus continues to make significant strides in academic excellence. I am particularly proud to highlight that, through the Extraordinary Gazette Notification issued in 2024, the Department of Mass Media has been formally recognized as a Faculty. Plans are underway to establish a dedicated Faculty of Performing Arts in the near future, with initial steps already taken in that direction.

This symposium stands as a testament to our commitment to improving academic dialogue and collaborative research. We hope that the knowledge generated and exchanged here will not only benefit our nation but also contribute to meaningful global academic discourses.

I wish to express my heartfelt gratitude to the Vice-Chancellor of the University of Colombo, Senior Professor Indika Mahesh Karunathilake, for his continued support and guidance in making this academic milestone a success. I also extend my sincere thanks to our distinguished keynote speaker, Professor Eric Steinhauer, Director of the Fern University Library in Hagen, Germany, for gracing this occasion and enriching our symposium with his scholarly contribution. My appreciation further extends to the Symposium Chair, Dr. Nirosha Dissanayaka, all committee members, academic and administrative staff, non-academic staff, undergraduate and postgraduate students, local and international participants, media personnel, and all others who contributed to the success of this event.

In conjunction with this symposium, we have also successfully conducted an undergraduate research forum, and we look forward to continuing this initiative in the near future.

May this symposium inspire new ideas, strengthen academic networks, and pave the way for transformative research in the years to come.

MESSAGE FROM THE SYMPOSIUM CHAIR

Dr. Nirosha Neranjala Dissanayaka

*Department of Mass Media, Sri Palee Campus
University of Colombo
Sri Lanka*



It is with great honour and enthusiasm that I welcome all participants to the Annual International Research Symposium (AIRS) 2025, themed “Transformations in Arts and Media in the Post-Global Era.”

This symposium serves as a dynamic platform for scholars, researchers, and practitioners from around the world to gather, exchange insights, and engage in meaningful dialogue about the evolving landscape of arts and media amidst the rapid transformation characteristic of our increasingly interconnected world. As we navigate new technological innovations, cultural shifts, and emerging trends, this forum offers a valuable opportunity to explore innovative ideas and foster collaborative research endeavors.

I wish to express my profound gratitude to the Vice-Chancellor of the University of Colombo, Senior Professor Indika Mahesh Karunathilake, for his unwavering support and guidance, which have been instrumental in the successful realization of this academic milestone. I also extend my sincere appreciation to the Rector of Sri Palee Campus, Professor Prathiba Mahanamahewa, for his visionary leadership in transforming this symposium into a reality.

Furthermore, I am deeply grateful to our distinguished keynote speaker, Professor Eric Steinhauer, Director of the Fern University Library in Hagen, Germany, for honouring us with his presence and enriching our symposium through his scholarly insights.

I also wish to acknowledge our plenary speakers—Professor Aruchelvan Sriram, Associate Professor Darshan Satishchandra Purohit, and Associate Professor Andrea Virginás—for their valuable contributions.

We extend our sincere appreciation to the Marga Institute and SLT Mobitel for their generous sponsorship and unwavering support, which have played a vital role in the successful organization of this symposium.

Finally, I extend my heartfelt appreciation to the organizing committee, editorial committee, inauguration committee, web and publishing committee, and all participants whose dedication

and scholarly pursuits have made this event possible. Your collective efforts exemplify the spirit of academic excellence and global engagement that our institution aspires to foster.

May this symposium inspire fresh perspectives, strengthen our international networks, and contribute to impactful research that benefits not only Sri Lanka but resonates across the global academic community.

Thank you for your active participation and commitment to advancing knowledge in arts and media in this dynamic post-global era.

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SYMPOSIUM PROGRAMME

8.30 am – 9.00 am	Registration of Participants
9.00 am – 9.05 am	Arrival of Guests and Invitees
9.05 am – 9.10 am	National Anthem Lighting of the Oil Lamp
9.10 am – 9.20 am	Welcome Address <i>Prof. Prathibha Mahanamahewa</i> <i>Rector, Sri Palee Campus, University of Colombo</i>
9.20 am – 9.30 am	Address by the Chief Guest <i>Prof. Indika Mahesh Karunathilake</i> <i>Vice Chancellor, University of Colombo</i>
9.30 am – 9.35 am	Launching of the Proceedings of the Symposium by the Chief Guest, Keynote speaker, and Rector
9.35 am -9.40 am	Presenting the Token of Appreciation to the Chief Guest
9.40 am – 9.45 am	Introduction of the Keynote Speaker <i>Prof. Ranjan Hettiarachchi</i>
9.45 am – 10.15 am	Keynote Address <i>Prof. Dr. Jur. Eric W. Steinhauer</i> <i>Director of the Fern University Library in Hagen, Germany</i>
10.15 am – 10.20 am	Presenting the Token of Appreciation to the Keynote Speaker
10.20 am – 10.30 am	Vote of Thanks <i>Dr. Nirosha Neranjala Dissanayaka</i> <i>Symposium Chair – AIRS 2025</i>
10.30 am – 10.40 am	Group Photographs
10.40 am – 11.00 am	Refreshment
11.00 am – 1.00 pm	Morning Sessions
1.00 pm – 1.45 pm	Lunch
1.45 pm – 3.45 pm	Afternoon Sessions
4.00 pm – 5.00 pm	Closing Remarks Cultural Event

INTRODUCTION TO KEYNOTE SPEAKER

Professor Dr. Jur. Eric W. Steinhauer

*Director of the Fern University Library
Department of Philosophy, Religion and Philology
Hagen University Library, Universitätsstr. 21, D-58097 Hagen
Germany*



Professor Dr. Jur. Eric W. Steinhauer is the Director of the University Library of Hagen, serving approximately 70,000 distance-learning students. In addition to his work as a director and librarian, he serves as an honorary Professor at the Institute for Library and Information Science at Humboldt University in Berlin, where he teaches courses on library science, copyright, and media law. He is also a member and spokesperson of the National Ombudsman Committee for Research Integrity in Germany, overseeing issues of good scientific practice in universities and research institutions. He pursued a diverse educational background, studying law, Catholic theology, political science, and education at the University of Münster and the University of Hagen. After completing his studies, Steinhauer worked at various university libraries, including the University Library of Freiburg, the University Library Ilmenau, and the University Library Magdeburg. He has also lectured on cultural studies of the morbid at Humboldt University on Halloween. As a director, lawyer, librarian, and honorary professor, Eric Wilhelm Steinhauer has dedicated his career to advocating for open access to scientific information and publications. He supports hybrid publishing, which provides both printed and online access to publications at no cost, and advocates for reforms in German library legislation. He has published over 420 works, including monographs, research papers, and books, and has made approximately 250 presentations in both German and English. He has extensive academic connections and influence in copyright law and library digitalization in Germany and abroad. He is a valuable asset to the academic community in Germany and beyond, thanks to his expertise in library and copyright law.

ABSTRACT OF THE KEYNOTE ADDRESS

Being an Academic in the Age of Artificial Intelligence

Professor Dr. Jur. Eric W. Steinhauer

*Director, Department of Philosophy, Religion and Philology, Hagen University Library,
Universitätsstr, Germany*

Reading and writing have long been the defining practices of academic life. To read has meant more than collecting information; it has meant engaging with texts as encounters that shape thought. To write has meant more than producing sentences; it has meant clarifying ideas, taking intellectual risks, and standing behind one's arguments. In short, scholarship has always been a dialogue between reading and writing, between receiving knowledge and creating it.

Today, however, artificial intelligence unsettles both of these practices. Machines can scan vast libraries in seconds, summarize arguments, and highlight connections across disciplines. They can also generate essays, reports, and even research proposals that, at first glance, appear polished and persuasive. For academics, this creates both extraordinary opportunities and profound challenges.

The keynote explores what it means to remain a scholar in such a landscape. It argues that the essence of expertise is shifting: from the accumulation of information to the exercise of judgment; from producing text to taking responsibility for ideas. In this new environment, academics are not defined by how much they have read or how quickly they can write, but by their ability to discern what matters, to interpret significance, and to embody intellectual integrity.

Several scenarios for the academic future will be presented, ranging from AI as a supportive tool to AI as a possible replacement. Yet the keynote ultimately emphasizes a third path: the transformation of academic practice. By allowing AI to handle routine tasks while reclaiming the slower, riskier, and more responsible dimensions of reading and writing, scholars can sharpen their role rather than lose it.

In a time when machines can imitate many academic skills, the qualities that cannot be automated—creativity, judgment, responsibility—become all the more vital. The lecture invites participants to reflect not only on how to adapt to AI but on how this moment may help clarify the true vocation of the academic.

LIST OF ABSTRACTS

A critical analysis of the influence of the law of defamation on the freedom of the press in Sri Lanka

P. Mahanamahewa, N. M. N. N. Thilakaratne 516

Adoption of mobile reading applications (Apps) and their influence on reading practices in Sri Lanka

K. P. Gamage, H. M. D. Malinda 517

Beat the Beast: Adapting the fairy tale Beauty and the Beast to expose sexual harassment and empower communities through theatre

W. P. I. De Mel 518

The role of music in shaping choreographic identity in Sri Lankan contemporary dance

K. M. D. D. K. Bandara, G. G. G. L. Abeysekara 519

A critical analysis of the influence of the law of defamation on the freedom of the press in Sri Lanka

P. Mahanamahewa¹, N. M. N. N. Thilakarathne²

¹*Sri Palee Campus, University of Colombo, Sri Lanka*

²*The Associated Newspapers of Ceylon Limited, Sri Lanka*

Freedom of expression has been considered a fundamental right that should be ensured for the smooth functioning of a democratic society. Mass media is the main social body that exercises the freedom of expression on behalf of the public. However, there is considerable criticism of the behaviour of the mass media, alleging that they abuse the right to freedom of expression without regard for individual rights, such as reputation or ethical standards. Therefore, the need for the law of defamation, which is closely tied to the right to reputation, has been emphasized as a crucial aspect of the law. In such a context, the right to reputation and the freedom of the press have become conflicting rights. Although the influence of the law of defamation on freedom of speech has been widely discussed and examined in many countries, there is a lack of studies in Sri Lanka. Therefore, the problem that was examined in this research is how the law of defamation has influenced freedom of the press in Sri Lanka. The researcher applied the doctrinal approach to collect data, and accordingly, statutory provisions, instruments such as mass media ethics, and case law were examined. In analysing the data, a thematic approach was applied. The data were categorized into initial codes and main themes, and thereafter, five main themes and fifteen sub-themes were identified. The data were analysed critically, and interpretation rules, press theories, and balancing theories were applied as a theoretical framework for the analysis. It was found that the law of defamation has influenced the freedom of the press in Sri Lanka, with some aspects having a positive impact and others a negative impact. Furthermore, it was found that the purpose of the law of defamation is to balance the right to reputation and the freedom of the press rather than merely to protect the right to reputation. The findings of the research will be advantageous for academicians, researchers, journalists and editors, media owners, policymakers, legislators, judges, and lawyers, and it will result in the development of a highly developed balancing system relevant to the right to reputation and the freedom of the press.

Keywords: *Freedom of the press, Defamation, Influence of law, Theories of the press, Balancing theories*

Adoption of mobile reading applications (Apps) and their influence on reading practices in Sri Lanka

K. P. Gamage¹, H. M. D. Malinda²

¹*Department of Mass Media, Sri Palee Campus, University of Colombo, Sri Lanka*

²*National Library and Documentation Services Board, Sri Lanka*

The book has historically served as a central medium for recording, transmitting, and preserving human knowledge, evolving in form and appearance in response to technological and cultural changes. In the contemporary era, however, the traditional printed book is increasingly giving way to digital platforms and mobile reading applications, prompting fundamental shifts in global publishing practices. This transformation has also affected reading cultures in Sri Lanka, where print and digital formats now coexist in complex ways. The present study examines the impact of the transition from print to digital books on Sri Lankan readers, with a focus on technological acceptance, generational differences, and the role of global platforms in shaping local practices. The research is guided by the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT). A structured questionnaire was administered to 200 respondents, aged between 10 and 60 years, who access books through online platforms. Data were analyzed using SPSS 22 and NVivo 14. For generational analysis, respondents were categorized as Generation Z (10–18), Generation Y (19–40), Generation X (41–50), and Baby Boomers (51+). Findings indicate that Baby Boomers predominantly prefer printed books, citing limited digital literacy, physical constraints, and a strong cultural attachment to the printed medium. In contrast, Generations Z and Y demonstrate hybrid reading behaviours, engaging with both print and mobile applications, with a marked preference for digital formats due to their convenience and accessibility. Generation X occupies an intermediate position, reflecting gradual adaptation to digital technologies. Notably, most Sri Lankan readers rely on foreign-developed mobile reading applications, revealing a lack of locally tailored digital publishing solutions. The study concludes that while print retains cultural and emotional significance, digital reading is reshaping reader behaviour in Sri Lanka, presenting both challenges and opportunities for publishers, educators, and policymakers.

Keywords: *Book publishing industry, Printed books, e-books, Mobile phone reading applications, Reading practice*

Beat the Beast: Adapting the fairy tale *Beauty and the Beast* to expose sexual harassment and empower communities through theatre

W. P. I. De Mel

Department of Performing Arts, Sri Palee Campus, University of Colombo, Sri Lanka

This research project, *Beat the Beast*, utilizes the fairy tale *Beauty and the Beast* through the lens of community-devised theatre to examine and expose sexual harassment within society. Based on a real-life story of harassment during a theatrical production, the project investigates the romanticized tropes of submission, transformation, and redemption often found in traditional narrative tropes that can obscure and maintain the patriarchal power structures and normalize abuse. Grounded in feminist performance theory, trauma-informed dramaturgy, and participatory practice, the project employs a qualitative research methodology that involves focus groups to collaboratively develop a performance with community participants, survivors, allies, and local performers. By centering lived experiences and collective storytelling, the process enables participants to reclaim narrative agency and co-create a space for healing, resistance, and visibility. Integral to the production are post-performance audience engagement forums designed to foster dialogue, raise awareness, and activate community response. These interactive forums transform spectators into stakeholders, promoting shared accountability and social action. Through this layered approach, *Beat the Beast* positions community theatre not merely as artistic expression but as a catalyst for empowerment, critical reflection, and tangible change in confronting gender-based violence.

Keywords: *Community-devised theatre, Gender-based violence, Feminist theatre, Applied theatre, Empowerment*

The role of music in shaping choreographic identity in Sri Lankan contemporary dance

K. M. D. D. K. Bandara¹, G. G. G. L. Abeysekara²

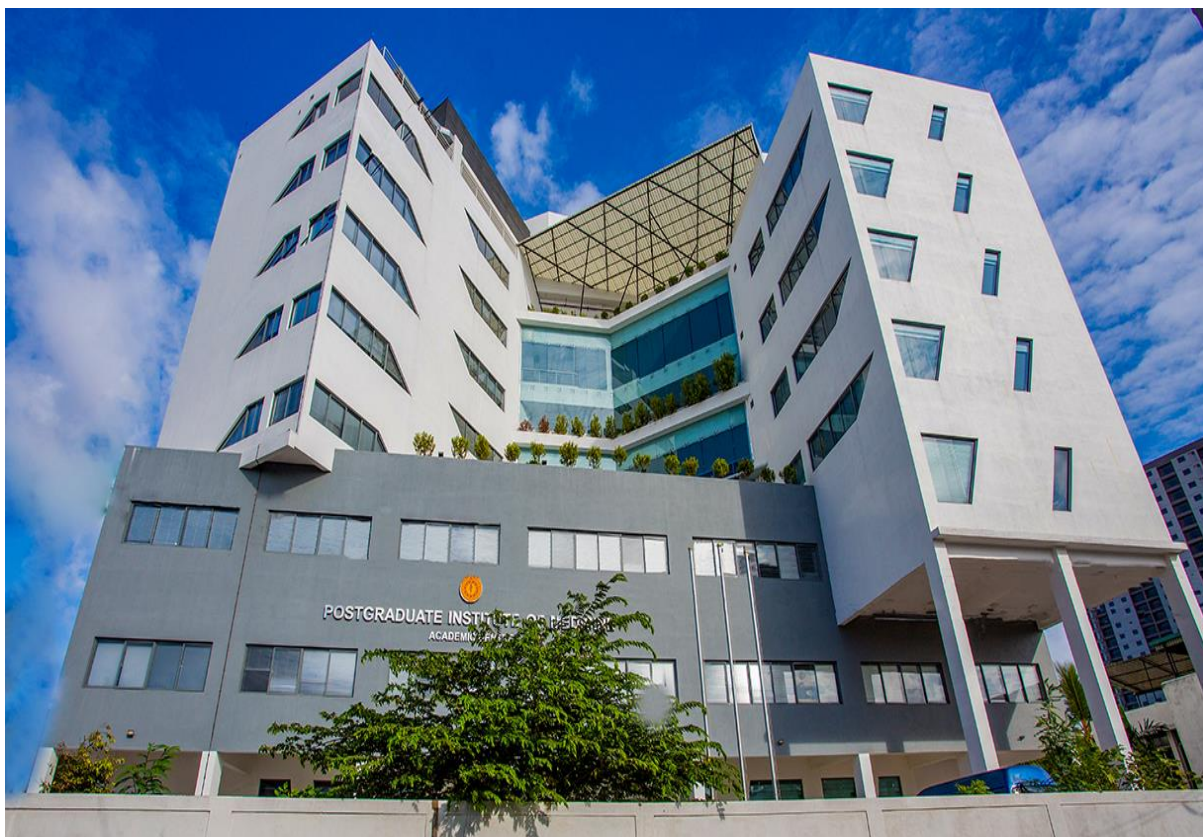
¹*Department of Performing Arts, Sri Palee Campus, University of Colombo, Sri Lanka*

²*Faculty of Graduate Studies, University of Sri Jayewardenepura, Sri Lanka*

Contemporary dance refers to prioritizing improvisation as a central creative method and a key element of performer skill. The specialty of contemporary dance lies in its freedom, versatility, and expressive depth. Unlike classical dance forms that follow strict structures and codified techniques, contemporary dance embraces experimentation, individuality, and innovation. As a non-structured form, its movement patterns often emerge from the dancer's individual improvisational style. This study explores the role of music in the creative identity of contemporary dance in Sri Lanka. Using a qualitative approach and grounded theory, the study employed narrative analysis to interpret the data through in-depth interviews with the participants. It investigates how music is selected, composed, or manipulated in the creation of contemporary dance patterns. The research further examines the dynamic interplay between sound and movement, emphasizing how music contributes to narrative construction, emotional depth, and interpretation within contemporary dance practice. The findings reveal diverse musical approaches ranging from traditional reinterpretations to experimental soundscapes, each reflecting the choreographer's artistic vision and sociocultural context.

Keywords: *Contemporary dance, Creative identity, Improvisation, Music and movement*

POSTGRADUATE INSTITUTE OF MEDICINE (PGIM)



Ethics and Medico-Legal Awareness in Healthcare

7th November 2025

MESSAGE FROM THE DIRECTOR

Professor Senaka Rajapakse

*Postgraduate Institute of Medicine
University of Colombo
Sri Lanka*



The Postgraduate Institute of Medicine (PGIM) remains steadfast in its mission to advance excellence in postgraduate medical education, training, and research. As Sri Lanka's premier institution for producing specialists in medicine and dentistry, PGIM recognizes the indispensable role of research in shaping practitioners who are not only competent and evidence-based, but also ethical and accountable.

This year's Annual Research Symposium of the PGIM is built around the theme "*Ethics and Medico-Legal Awareness in Healthcare*"—a theme both timely and vital in today's complex clinical environment. Ethical practice and medico-legal understanding are cornerstones of safe patient-centered care. As healthcare professionals, we must go beyond technical expertise to embrace the ethical and legal responsibilities that underpin every clinical decision.

The PGIM has consistently integrated research into postgraduate training, encouraging trainees to push boundaries, question assumptions, and contribute to the growth of medical knowledge. The symposium provides a forum for trainees, trainers, and researchers alike to present their work, engage in constructive dialogue, and reflect deeply on the ethical implications of their findings.

I am confident that this year's symposium will spark meaningful discussions, promote collaboration across disciplines, and reaffirm our collective commitment to ethical integrity in healthcare. I extend my sincere gratitude to all participants for their contributions, and to the organizing committee for their dedication in bringing this event to life. May this symposium be an enriching and memorable academic experience for all.

MESSAGE FROM THE SYMPOSIUM CHAIR

Dr. G. Amodini Rajakaruna

*Postgraduate Institute of Medicine
University of Colombo
Sri Lanka*



It is with great pleasure that I warmly welcome you on behalf of the organizing committee, to the Annual Research Symposium of the Postgraduate Institute of Medicine (PGIM) for the year 2025. This year's theme, "Ethics and Medico-Legal Awareness in Healthcare", highlights a vital and timely area of focus for all healthcare professionals. As the boundaries of clinical practice continue to evolve, the need for ethical clarity and medico-legal literacy has never been more critical.

This symposium serves as a platform not only to explore these important dimensions but also to reinforce our commitment to evidence-based practice. In an era where clinical decisions must be guided by robust data and ethical reasoning, research becomes the cornerstone of quality healthcare. We are proud to see increasing engagement in research by both trainees and trainers, and we remain committed to fostering a culture of inquiry, critical thinking, and academic excellence.

In line with our holistic approach to postgraduate education, we are also pleased to introduce a pre-congress workshop on soft skills under the theme "Workshop on Soft Skills: Sharing Experience to Enhance Educational Practices". This initiative aims to strengthen essential competencies such as communication, leadership, and professionalism—skills that are indispensable in delivering compassionate and effective care.

I extend my sincere gratitude to all researchers, presenters, reviewers, and organizers whose dedication has made this event possible. May this symposium inspire meaningful dialogue, encourage ethical reflection, and promote a deeper understanding of the medico-legal responsibilities we all share. Let us continue to uphold the highest standards of integrity, professionalism, and scientific rigour in our journey towards excellence in healthcare.

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Pre-congress Workshop on “Soft Skills: Sharing Experience to Enhance Educational Practices”

3rd November 2025

This workshop explores **four core domains** of soft skills—*what to teach, how to teach, how to assess, and how to internalize*—as progressive innovations in postgraduate medical education.

Domains & Resource Persons

- **Interpersonal & Social Skills:** Communication, care, connectivity, compassion (C4), flexibility, leadership, initiative, productivity, social manners (FLIPS)
Prof. Diyanath Samarasinghe, Dr. Sudath Dharmaratne, Dr. Damayanthi Pieris, Dr. Modini Jayawickrama
- **Learning Skills & Professional Growth/Identity:** Critical thinking, creativity, communication, collaboration, ethics, transformative learning, professional identity formation
Prof. Madawa Chandratilake, Dr. Himani Molligoda, Prof. Pandula Siribaddana
- **Intrapersonal Skills & Character Development:** Tolerance, resilience, adaptability, patience, courage, curiosity, compassion, equity, responsibility
Prof. Narada Warnsuriya, Dr. Amodini Rajakaruna, Dr. Kamani Samarasinghe
- **Meta-Learning, Values, Wellness & Personal Growth:** Reflective practice, self-esteem, transcendence, wisdom, justice, humanity, wellness
Prof. Saroj Jayasinghe, Dr. R. M. Mudiyanse

PRE-CONGRESS WORKSHOP – AGENDA

9.00 am – 9.05 am	Welcome <i>Dr. Amodini Rajakaruna</i> <i>Chair, Annual Research Symposium</i>
9.05 am – 9.15 am	Workshop Objectives <i>Prof. Pandula Siribaddana</i>
9.15 am – 9.25 am	Results of the pre-workshop survey <i>Ms. Symthiya S. Rexon</i>
9.25 am – 9.45 am	Introduction to Four Domains and Curriculum Model <i>Dr. R. M. Mudiyanse</i>
9.45 am – 10.30 am	Group Work 1: “What to Teach and Why?” (Impact on self & society, ILOs/PLOs)
10.30 am – 11.00 am	Tea Break & Gallery Walk: Exploration and Reflection
11.00 am – 11.15 am	Introduction to methods of teaching <i>Dr. R. M. Mudiyanse</i>
11.15 am – 12.30 pm	Group Work 2: “How to Teach?” (Educational practices, strategies)
12.30 pm – 1.30 pm	Lunch & Gallery Walk: Continued Reflection and Feedback
1.30 pm – 2.15 pm	Group Work 3: “How to Assess and Evaluate?” (Feedback, tests, societal change)
2.15 pm – 3.30 pm	Group Presentations (15 min each) & Open Discussion
3.30 pm – 3.35 pm	Concluding Remarks & Next Steps: Collaborative research and educational activities

SYMPOSIUM PROGRAMME

8.30 am – 8.50 am	Commencement and National Anthem, Lighting of the Oil Lamp
8.50 am – 9.00 am	Welcome Address <i>Director, PGIM</i>
9.00 am – 9.15 am	Address by the Chief Guest <i>Prof. Indika Karunatilake, Vice-Chancellor University of Colombo</i>
9.15 am – 9.20 am	Introduction to the Keynote Speaker <i>Deputy Director, PGIM</i>
9.20 am – 9.40 am	Keynote Address <i>Mr. Geoffrey Alagaratnam, President's Counsel</i>
9.40 am – 9.45 am	Introduction to the Orator
9.45 am – 10.15 am	PGIM Oration
10.15 am – 10.25 am	Vote of Thanks <i>Dr. Amodini Rajakaruna, Symposium Chair</i>
10.30 am – 11.00 am	Refreshments / Poster presentations
11.00 am – 1.15 pm	Free Paper Sessions (Auditorium) Parallel Sessions (Multipurpose Room)
1.15 pm – 1.30 pm	Awards for the Best Oral and Poster Presentations
1.30 pm – 2.30 pm	Lunch

INTRODUCTION TO THE KEYNOTE SPEAKER

Mr. Geoffrey Alagaratnam

*President's Counsel
Sri Lanka*



Geoffrey Alagaratnam, President's Counsel and Past President of the Bar Association of Sri Lanka for years 2015/2016 and 2016/2017, was admitted to the Bar having passed his final examination at the Sri Lanka Law College with Honours. He holds an Honours Degree in Law from the Faculty of Law of the University of Colombo. He counts forty-five years in legal practice.

He practices in the original and appellate courts of Sri Lanka, specialising in Industrial, Corporate, Banking and Intellectual Property Law, and, engages in an advisory practice in industrial and commercial transactions among others. He also practices before Statutory Authorities / bodies and Commercial Arbitral Tribunals. He has taken a keen interest in areas of Public Law and is actively involved in Public Interest litigation and issues of Public Interest. He has also been a lecturer at the Faculty of Law, University of Colombo, Sri Lanka and an examiner.

He has taken a keen interest in Professional Development of Attorneys-at-Law and the need for Continuing Legal Education. He has also demonstrated an interest in developing a programme on Access to Justice or legal aid as it is popularly referred to and has taken a keen interest in development of professionalism through greater emphasis on professional ethics.

ABSTRACT OF THE KEYNOTE ADDRESS

Ethics and Medical Responsibility

Mr. Geoffrey Alagaratnam

President's Counsel

- What should a keynote address involve?
- Why and what for of ethics?
- What is ethics? - refined good behaviour.
- What is a profession? – a role of service founded on the competence and integrity and not a mere job or business - for money making.
- The cultural background and societal conditions that evolve and shape ethics. Should ethics evolve with the times?
- The role of medical professional and his responsibilities in several contextual situations.
E.g. The medical professional as an administrator.
E.g. In administering an office or wards vis-a-vis superiors, peers and subordinates.
The in calculation of values for efficient administration and governance.

The medical professional in the strict medical role

In dealing with patients: efficiency and transparency, honesty and competence and responsibility; fulfillment of skills through study, diagnosis and procedures.
Avoidance of conflict of interest or appearance of self-serving treatment or aggrandizement at the expense of the patient.

Follow-up and accessibility

Bedside manner - realizing the holistic nature of the human being needs to comfort and treat both mind and body.

LIST OF ABSTRACTS

All the accepted abstracts for the Annual Research Symposium 2025 will be published in a special supplement of the Journal of the Postgraduate Institute of Medicine (JPGIM).

- 1. Factors associated with anaemia during the antenatal period among mothers attending antenatal clinics in Medical Officer of Health areas, Millaniya & Horana**
J. W. T. Rangika¹, H. P. Madarasinghe², B. H. W. K. De Silva³, S. A. R. G. Tharanga³, R. S. Weerasinghe³, H. H. H. Kawshani¹
¹Regional Director of Health Services, Kalutara
²Postgraduate Institute of Medicine, University of Colombo, Sri Lanka
³Base Hospital Horana
- 2. Undernutrition and its contributing factors among children aged 6–24 months attending a tertiary care hospital: A cross-sectional descriptive study**
M. B. N. Mannapperuma¹, S. Ganesan²
¹Postgraduate Institute of Medicine, University of Colombo, Sri Lanka
²Colombo South Teaching Hospital, Kalubowila
- 3. Evaluation of clinical outcomes in patients admitted with cellulitis in a Surgical Unit**
A. R. M. Isthiyak¹, E. Rajasegaram²
¹Postgraduate Institute of Medicine, University of Colombo, Sri Lanka
²Consultant General Surgeon, National Hospital of Sri Lanka
- 4. Assessment of risk factors contributing to the occurrence of Inguinal Hernias: A cross-sectional study in a tertiary care setting**
T. G. K. Weranja¹, D. Ariyaratne², J. Vishnukanthan¹
¹Postgraduate Institute of Medicine, University of Colombo, Sri Lanka
²Colombo South Teaching Hospital, Kalubowila
- 5. Evaluating the role of Diagnostic Laparoscopy in Right Iliac Fossa Pathologies in the context of Sonographic Evidence of Inflammation**
T. G. K. Weranja¹, D. Ariyaratne², J. Vishnukanthan¹
¹Postgraduate Institute of Medicine, University of Colombo, Sri Lanka
²Colombo South Teaching Hospital, Kalubowila
- 6. Pre-operative anxiety and coping strategies in adults awaiting elective surgery: A cross-sectional study in a Surgical Unit of a Tertiary Care Center**
T. G. K. Weranja¹, D. Ariyaratne², K. Wijesinghe², J. Vishnukanthan¹
¹Postgraduate Institute of Medicine, University of Colombo, Sri Lanka
²Colombo South Teaching Hospital, Kalubowila
- 7. Perceptions regarding traditional bone setting among patients with fractures in National Hospital of Sri Lanka**
K. Sathiyathan¹, I. S. U. Dias², N. Tharmakulasingham¹, C. Navarathnam¹
¹Postgraduate Institute of Medicine, University of Colombo, Sri Lanka
²Accident and Emergency, District General Hospital Avissawella

8. **Immunophenotypic analysis of B-cell Acute Lymphoblastic Leukaemia at a tertiary care hospital in Sri Lanka**
B. L. T. Balasuriya, D. C. P. Fernando, G. G. S. Madusanke, G. G. P. N. Kulasooriya, C. C. Kariyawasan
Sri Jayewardenepura General Hospital, Department of Haematology, Thalpathpitiya, Nugegoda, Sri Lanka
9. **The degree of severity of molar incisor hypomineralization and its relation to dental caries**
R. Godevithane¹, W. P. A. W. Goonathilake²
¹*Postgraduate Institute of Medicine, University of Colombo, Sri Lanka*
²*Institute of Oral Health, Maharagama, Sri Lanka*
10. **An empirically derived framework to ensure the sustainability of Electronic Medical Records (EMRs) to be adopted in a low-resource setting such as Sri Lanka**
D. A. N. Samarasinghe¹, R. B. Marasinghe², E. P. Wickramasinghe³
¹*Postgraduate Institute of Medicine, University of Colombo, Sri Lanka*
²*University of Sri Jayawardenepura, Sri Lanka*
³*Health Promotion Bureau, Sri Lanka*
11. **Competencies of Medical Officers in Charge, factors associated, and readiness of Primary Medical Care Units in early diagnosis and initiation of treatment for Leptospirosis in Ratnapura District**
P. V. P. D. Vithana¹, T. M. E. Dabrera²
¹*National Hospital, Galle*
²*Epidemiology Unit, Colombo*
12. **An audit on adherence to Peripheral Intravenous Cannula Care Guidelines in a general medical ward, Sri Jayewardenepura General Hospital, Sri Lanka**
R. M. D. L. Rathnayaka¹, C. De Silva², R. A. R. Ramzani¹
¹*Postgraduate Institute of Medicine, University of Colombo, Sri Lanka*
²*Sri Jayewardenepura General Hospital, Thalpathpitiya, Nugegoda*
13. **Immediate perioperative outcomes of complex hepatobiliary and pancreatic cases done at Peripheral Units**
H. P. H. Pathirathne, N. S. Atulugama
Teaching Hospital Kurunegala
14. **Socio demographic profile and selected predictors of pain perception among patients undergoing fixed orthodontic treatment attending the Orthodontic Unit, National Dental Hospital (Teaching), Sri Lanka**
H. G. R. N. Weerasinghe¹, I. R. Perera², W. M. Senadeera²
¹*Postgraduate Institute of Medicine, University of Colombo, Sri Lanka*
²*National Dental Hospital (Teaching), Colombo*
15. **The patterns of spinal injuries presenting to the only Neurosurgical Centre in a province – the experience of a single neurosurgeon**
K. A. A. J. Perera¹, J. H. M. A. E. Jayapathma², P. R. Liyanawaduge²
¹*Postgraduate Institute of Medicine, University of Colombo, Sri Lanka*
²*Teaching Hospital, Ratnapura*

16. **Spectrum of surgical management of spinal injuries – A descriptive analysis from a single neurosurgical centre**
K. A. A. J. Perera¹, K. M. M. P. Dayawansa², K. D. H. Samarathunga²
¹Postgraduate Institute of Medicine, University of Colombo, Sri Lanka
²Teaching Hospital, Ratnapura
17. **Flood preparedness behaviour and associated factors among pregnant mothers and mothers attending vaccination clinics residing in Akurana Divisional Secretariat Division**
W. M. T. V. D. Wijekoon¹, D. A. Gunawardane²
¹Postgraduate Institute of Medicine, University of Colombo, Sri Lanka
²Faculty of Medicine University of Peradeniya
18. **Integrating AI to Medical Education: Readiness, Knowledge and Expectations of pre-clinical academics of the Faculty of Medicine, University of Colombo**
N. Dharmarathne¹, R. Hewapathirana², P. A. Siribaddana³
¹Lady Ridgeway Hospital for Children, Colombo
²Faculty of Medicine, University of Colombo, Sri Lanka
³Postgraduate Institute of Medicine, University of Colombo, Sri Lanka
19. **Assessment of cardiometabolic risk factors in patients with chronic Liver Cell Disease at Teaching Hospital Anuradhapura, Sri Lanka: Insights into Metabolic dysfunction-associated Steatotic Liver Disease (MASLD) and Metabolic dysfunction-and Alcohol-related Liver Disease (MetALD) phenotypic profiles**
N. P. Premawardana¹, G. C. V. De Silva¹, S. D. N. Senadhira¹, J. Warnasekara¹, H. D. Umayanga¹, H. A. N. Fonseka¹, K. D. Samarasinghe², N. Shanmuganathan², Y. D. Karunarathne¹, S. S. Karawita¹
¹Teaching Hospital Anuradhapura
²Postgraduate Institute of Medicine, University of Colombo, Sri Lanka
20. **A novel approach to prescription auditing: Prescription Pattern Insights via Electronic Medical Record Systems in a shared care cluster Divisional Hospitals in Sri Lanka**
I. L. A. N. Darshana¹, P. Illangasinghe¹, B. Dayarathne², P. Karunapema²
¹Postgraduate Institute of Medicine, University of Colombo, Sri Lanka
²Health information unit, Ministry of Health, Sri Lanka
21. **Racing against time: Profiling road traffic accident casualties and their pre-hospital transit to the National Hospital of Sri Lanka**
A. M. H. Attanayake¹, L. Panapitiya², A. U. Gamage³
¹Postgraduate Institute of Medicine, University of Colombo, Sri Lanka
²Ministry of Health, Colombo
³General Sir John Kotelawala Defense University, Ratmalana
22. **Complication Spectrum of Chronic Liver Cell Disease (CLCD) in Anuradhapura, Sri Lanka: Insights from a hospital-based CLCD registry - Preliminary report**
N. P. Premawardana¹, G. C. V. De Silva¹, S. D. N. Senadhira¹, J. Warnasekara¹, H. D. Umayanga¹, H. A. N. Fonseka¹, K. D. Samarasinghe², N. Shanmuganathan², Y. D. Karunarathne¹, S. S. Karawita¹
¹Teaching Hospital Anuradhapura
²Postgraduate Institute of Medicine, University of Colombo, Sri Lanka

23. **Growing up with grief: Proportion and socio-demographic realities of parentally bereaved children under 18 years in Gampaha District, Sri Lanka**
 P. Illangasinghe¹, P. Karunapema², P. Wijesinghe³, D. Karunapema²
¹Postgraduate Institute of Medicine, University of Colombo, Sri Lanka
²Ministry of Health, Colombo
³Lady Ridgway Hospital for Children, Colombo
24. **The association of selected physiological characteristics and cycling performance among male elite professional cyclists in Sri Lanka**
 W. J. M. P. S. M. Silva, D. M. P. Karawita, S. M. S. Jayaweera, A. D. P. Perera, S. P. Senanayake
Department of Physiotherapy, Faculty of Allied Health Sciences, General Sir John Kotelawela Defense University, Sri Lanka
25. **A clinical audit of antibiotic use in a medical ward at a Tertiary Care Hospital in Sri Lanka**
 H. Amanda¹, K. A. Nanayakkara¹, W. M. I. N. Weerasinghe¹, S. A. S. P. Subasinghe²
¹Postgraduate Institute of Medicine, University of Colombo, Sri Lanka
²Sri Jayewardenepura General Hospital
26. **Descriptive study on landslides preparedness of households in risk Grama Niladhari Areas in Palindanuwara Medical Officer of Health Area of Kalutara District**
 H. R. W. Fonseka¹, C. A. Hettiarachchi²
¹National Hospital of Sri Lanka, Colombo
²National Institute of Health Sciences, Kalutara
27. **HIPEC - New hope for Peritoneal Carcinomatosis**
 S. A. T. N. Abeyweera¹, H. P. H. Pathirathne¹, J. C. Ariyaratne², S. D. Mahaliyana³, M. R. S. Manathunga³, N. W. B. K. H. De Silva¹, N. S. Atulugama¹
¹Teaching Hospital, Kurunegala
²National Cancer Institute, Sri Lanka
³National Hospital, Galle
28. **A cross-sectional study on the knowledge of Sri Lankan doctors regarding the legal and ethical aspects of Leave Against Medical Advice (LAMA)**
 K. G. R. L. A. Kobbegala¹, K. Weerawardhana², A. A. M. Siddique², S. A. D. Hansaja³
¹Postgraduate Institute of Medicine, University of Colombo, Sri Lanka
²Teaching Hospital, Kurunegala
³Faculty of Medicine, Wayamba University of Sri Lanka
29. **The dietary habits and associated factors of the school children in the Colombo District in Sri Lanka**
 P. M. Moonasinghe, C. Gajanayake, A. Jayathilake, K. Lakmal, K. Kalubowila
Regional Director of Health Service Office, Colombo 10, Sri Lanka
30. **Molecular characterization and phylogenetic analysis of the Mpox virus in Sri Lanka, 2022 – 2025**
 B. Samaraweera¹, M. A. Y. Fernando², G. Ruwan³, I. Samaraweera³, G. P. Chathuranga³, J. I. Abeynayake³

¹National STD/AIDS Control Programme, Colombo 10

²Department of Medical Microbiology and Immunology, Faculty of Medicine, University of Colombo, Sri Lanka

³Department of Virology, Medical Research Institute

31. Audit report: Comparative analysis of National Poisons Information Centre of Sri Lanka against international standards

S. A. A. Jagadeesh¹, E. S. W. De Silva², K. D. C. Fernando²

¹Postgraduate Institute of Medicine, University of Colombo, Sri Lanka

²National Poisons Information Centre, NHSL

32. Molecular epidemiology and clinical characterization of the re-emerging Chikungunya Virus infection in Sri Lanka

M. A. Y. Fernando¹, G. Ruwan², I. Samaraweera², G. P. Chathuranga², B. Samaraweera³, J. I. Abeynayake²

¹Department of Medical Microbiology and Immunology, Faculty of Medicine, University of Colombo, Sri Lanka

²Department of Virology, Medical Research Institute

³National STD/AIDS Control Programme, Colombo

33. Knowledge and associated factors on patient fall prevention among nursing officers in Sri Jayewardenepura General Hospital, Sri Lanka

A. S. Malsha¹, R. D. S. Ranasinghe²

¹Department of Nursing and Midwifery, Faculty of Allied Health Sciences, University of Sri Jayewardenepura

²Department of Community Medicine, Faculty of Medical Sciences, University of Sri Jayewardenepura

34. Co-designing a teleconsultation system for resource-constrained settings: Insights from a qualitative requirements study

K. M. M. P. B. Wijeratne^{1,2}, C. M. A. Anthony^{1,3}, M. H. B. Ariyaratna^{1,4}

¹Postgraduate Institute of Medicine, University of Colombo, Sri Lanka

²Lady Ridgeway Hospital for Children, Colombo

³Department of Family Medicine, Faculty of Medicine, University of Colombo, Sri Lanka

⁴Health Information Unit, Ministry of Health

35. Prevalence of overweight, obesity, and associated factors among individuals seeking Medical Fitness Certification at the National Hospital of Sri Lanka (NHSL)

M. D. N. D. Pushpakumara¹, A. Bandusena², S. P. Kurukulaarachchi³

¹Postgraduate Institute of Medicine, University of Colombo, Sri Lanka

²Health Promotion Bureau, Sri Lanka

³National Hospital of Sri Lanka

36. A clinical audit on the achievement of obesity treatment targets in patients attending the Medical Nutrition Unit, National Hospital Colombo over a six-month period

S. S. Liyanage¹, S. Kurukulaarachchi²

¹Postgraduate Institute of Medicine, University of Colombo, Sri Lanka

²Medical Nutrition Unit, National Hospital of Sri Lanka

37. **AI App Framework for Climate-Related Skin Health Issue Detection in Southeast Asia**
D. H. Jayakody
Postgraduate Institute of Medicine, University of Colombo, Sri Lanka
38. **Prevalence of adverse drug reactions to First Line Antituberculosis Drugs in Kegalle District, associated risk factors, and the impact on treatment**
H. R. U. D. Senanayaka¹, D. Nandadewa²
¹*Postgraduate Institute of Medicine, University of Colombo, Sri Lanka*
²*District General Hospital, Kegalle*
39. **Perception and knowledge of sexual and reproductive health, Cancer-Causing Viruses, and HPV vaccination among teachers, principals, and students in the Egodaunya Medical Officer of Health Division**
S. J. W. Withanage¹, S. Wijesekara², C. Gajanayake³, K. C. Kalubovila⁴, G. C. Nawagattegama¹, G. Ediriweera⁵
¹*MOH Egodaunya, Sri Lanka*
²*University Hospital Sussex. United Kingdom*
³*Regional Director of Health Services, Colombo, Sri Lanka*
⁴*Provisional Director of Health Services, Western Province*
⁵*Amrak Institute of Medical Sciences*
40. **Prevalence and predictors of depression among junior doctors in Sri Lanka: The role of personality traits**
S. K. A. B. Dilhara
Teaching Hospital Anuradhapura
41. **Growth outcomes of exclusively breastfed preterm neonates: Time to double birth weight in a Sri Lankan level three NICU**
B. R. R. N. Gunaratne¹, M. S. S. K. Bandara¹, G. A. D. N. B. Wimalasena¹
¹*Postgraduate Institute of Medicine, University of Colombo, Sri Lanka*
42. **Assessment of laboratory equipment utilization in the District General Hospital, Gampaha**
D. M. A. K. Dissanayake¹, G. S. K. Dharmaratne², M. S. Samarawickrama³
¹*Regional Director of Health Services, Kilinochchi*
²*Postgraduate Institute of Medicine, University of Colombo*
³*Sri Lanka Army Medical Corps, Army Hospital, Colombo*
43. **Shifting aetiology of Onychomycosis in Sri Lanka**
K. A. C. C. Pemasiri^{1,2,3}, B. U. Manukulasooriya¹, P. I. Jayasekera^{1,2}
¹*Department of Mycology, Medical Research Institute, Colombo*
²*Postgraduate Institute of Medicine, University of Colombo, Sri Lanka*
³*Department of Microbiology, Faculty of Medicine, University of Kelaniya, Ragama*
44. **A cross-sectional study to assess the prevalence of mild cognitive impairment in older adults with Diabetes Mellitus and its correlation to diabetes related complications**
R. P. D. P. Rajapakse¹, H. M. T. S. Herath¹, D. Amarasekara², S. Jayamanne²
¹*Postgraduate Institute of Medicine, University of Colombo, Sri Lanka*
²*CNTH Ragama*

45. **Intraoperative leak testing with methylene blue in bariatric surgery: A safety check or surgical necessity**
J. A. Vasanthan¹, T. Wijerathna²
¹*Registrar in Surgery, Colombo South Teaching Hospital*
²*Department of Surgery, University of Sri Jayawardanapura*
46. **Clinical characteristics and antibiotic use in patients admitted with Pyelonephritis and Urosepsis in a Teaching Hospital in Sri Lanka**
W. M. I. D. Nakkawita¹, A. G. Fernando¹, V. T. Kariyawasam², A. T. Sandaruwan²,
R. M. V. Ranasundara², U. T. N. Senaratne³, N. S. Fernando⁴, D. S. Govindapala⁵,
M. M. P. T. Jayasekara¹
¹*Faculty of Medicine, General Sir John Kotelawela Defense University*
²*University Hospital KDU*
³*Faculty of Allied Sciences, General Sir John Kotelawela Defense University*
⁴*Faculty of Medicine, University of Moratuwa*
⁵*Faculty of Medical Sciences, University of Sri Jayawardenapura*
47. **Evaluating the effectiveness of a breastfeeding counselling programme for midwives and nursing officers: A post-intervention audit**
J. K. D. N. Chanaka
Castle Street Hospital for Women, Colombo, Sri Lanka
48. **Impact of a capacity-building programme on midwives' emergency and holistic maternity care readiness: A pre-post interventional audit**
N. N. N. Perera, J. K. D. N. Chanaka
Castle Street Hospital for Women, Colombo, Sri Lanka
49. **Transparency in emergency care: An audit of patient autonomy through documentation of diagnosis disclosure in the Emergency Treatment Unit of the National Hospital of Sri Lanka**
H. M. G. N. Senevirathna^{1,2}, I. de Lanerolle², D. D. Bogahapitiya², H. M. H. S. Wijerathne²
¹*Postgraduate Institute of Medicine, University of Colombo, Sri Lanka*
²*Emergency Treatment Unit, National Hospital Colombo*
50. **Association between primary breast tumour location and axillary lymph node positivity in female breast cancer patients**
M. P. A. M. Weerasinghe¹, M. N. F. Nimza², B. N. L. Munasinghe²,
D. K. S. Solangaarachchi¹, K. A. D. Perera²
¹*Postgraduate Institute of Medicine, University of Colombo, Sri Lanka*
²*Department of Surgery, Faculty of Medicine, University of Kelaniya, Sri Lanka*
51. **Knowledge, attitudes, practices and perceived barriers on service provision for clients on domestic violence among field public health midwives in Gampaha District and associated factors for selected practices**
R. A. S. L. Ranaweera Arachchi¹, I. Malwenna¹
¹*Regional Director of Health Services, Gampaha, Sri Lanka*

- 52. Nutritional Risk Screening 2002 (NRS 2002) risk categories as predictors of clinical outcomes in patients admitted to the Intensive Care Units (ICU) in Colombo North Teaching Hospital: A prospective cohort study**
M. A. A. S. Munasinghe
Postgraduate Institute of Medicine, University of Colombo, Sri Lanka
- 53. Influence of overweight/obesity on morbidity and mortality of critically ill patients admitted to Intensive Care Units (ICU) in a Tertiary Care Hospital, Sri Lanka**
D. N. A. D. H. Nirupama
Postgraduate Institute of Medicine, University of Colombo, Sri Lanka
- 54. Prevalence of Obsessive-Compulsive Disorder (OCD) among medical and non-medical (Arts and Management) undergraduates of nine state universities of Sri Lanka during the COVID - 19 pandemic**
A. D. S. Karunathilake¹, S. Jeevathayaparan¹, I. A. H. Gamage¹, M. C. N. Madushanka¹, A. A. M. Savidya¹, K. G. M. Shiwanthini¹
¹*Faculty of Medicine, Wayamba University of Sri Lanka*
- 55. Troponin testing across Sri Lanka: Ethical and medico-legal implications of analytical and clinical disparities**
K. K. M. Fernando^{1,2}, D. W. D. D. Madurangi¹, M. J. N. Fernando¹, S. Madanayaka³, R. Samarasinghe⁴, B. K. T. P. Dayanath⁵
¹*Postgraduate Institute of Medicine, University of Colombo, Sri Lanka*
²*Faculty of Medicine, University of Kelaniya, Sri Lanka*
³*Colombo North Teaching Hospital, Ragama, Sri Lanka*
⁴*National Cancer Institute, Maharagama, Sri Lanka*
⁵*Dorevitch Pathology, Victoria, Australia*
- 56. Seasonal variation in Paediatric Intussusception: A retrospective study in a Tertiary Care Hospital in Sri Lanka**
N. A. K. A. Naligama¹, J. K. G. Madhawa¹, I. Rathnayaka¹, M. Samarasingha²
¹*Postgraduate Institute of Medicine, University of Colombo, Sri Lanka*
²*Faculty of Medicine, University of Colombo, Sri Lanka*
- 57. ADAM VS EVE- Gender bias in the Emergency Department - An observational audit of attitudes and practices**
N. Mudithakumara¹, M. G. A. Oshilani², S. A. Liyanage³
¹*Postgraduate Institute of Medicine, University of Colombo, Sri Lanka*
²*Faculty of Medical Sciences, University of Sri Jayawardenapura*
³*Colombo South Teaching Hospital*
- 58. Incidence of post-COVID-19 syndrome among survivors of COVID-19: A prospective cohort study in National Hospital Kandy**
D. Munasinghe¹, D. Jayawardane², L. Wanniarachchi²
¹*Postgraduate Institute of Medicine, University of Colombo, Sri Lanka*
²*Kandy Hospital*

59. Gendered dimensions of digital literacy: Analysing the impact of mobile technology on reading habits among Sri Lankan adolescents

K. G. V. J. Kobbegala, S. Bowattage, W. K. S. Kularatne

National Hospital, Kandy

List of Abstracts –Administrative and Managerial Aspects

1. Employee green competencies and character quality towards employee green behaviour

S. N. Jayasinghe

Postgraduate Institute of Medicine, University of Colombo, Sri Lanka

2. Awareness, perception, and attitudes of secondary-level and administrative staff regarding Quality Assurance Activities at a Higher Education Institution

D. D. G. P. S. Daniels, H. D. Molligoda, A. D. S. Karunathilake, D. V. Wickramarathne, T. M. S. Sathsarani

Postgraduate Institute of Medicine, University of Colombo, Sri Lanka

3. A secure, eco-conscious Java-Based standalone application for MCQ management and automated exam paper generation

D. Sellembaram

Postgraduate Institute of Medicine, University of Colombo, Sri Lanka

4. Stakeholder acceptance of psychosocial approaches and the need for structured debriefing in sexual-violence investigations in Sri Lanka; A qualitative study conducted in 6 police areas

C. M. A. Gunathilaka, N. D. N. A. Mendis

Department of Forensic Medicine and Toxicology, Faculty of Medicine, University of Colombo, Sri Lanka

5. Evaluation of a low-cost Moulage Technique for enhancing education and training in crime scene investigation

C. M. A. Gunathilaka¹, S. A. Gunawardena²

¹*Department of Forensic Medicine and Toxicology, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Department of Pathology & Pharmacology, School of Medicine, IMU University, Kuala Lumpur, Malaysia*

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING (UCSC)



Shaping Tomorrow: The Era of Intelligent Transformation

19th and 20th November 2025

MESSAGE FROM THE DIRECTOR

Dr. Ajantha Atukorale

*University of Colombo School of Computing
University of Colombo
Sri Lanka*



As the Director of the University of Colombo School of Computing (UCSC), it is my great pleasure to extend a warm welcome to all participants, researchers, and practitioners in the field of Computing to the International Conference on Advances in ICT for Emerging Regions (ICTer 2025). ICTer is a continuation of a proud legacy that began with the International Information Technology Conference (IITC), a pioneering event in Sri Lanka's computing research landscape since 1998. Building on this rich history, ICTer has become its successor, reaffirming our commitment to fostering innovation, sharing knowledge, and advancing the frontiers of technology.

In today's fast-evolving digital world, it is essential to create spaces for the exchange of ideas, insights, and research findings. ICTer serves as such a platform bringing together seasoned researchers and young scholars alike to present groundbreaking results, innovative concepts, and practical applications that are shaping the future of computing.

A hallmark of ICTer is that selected high-quality papers will be considered for publication in the prestigious Springer Communications in Computer and Information Science (CCIS) series and ICTer Journal by the UCSC. This offers authors an invaluable opportunity to reach a global audience and contribute meaningfully to the advancement of technology worldwide.

As we come together for ICTer 2025, I encourage you to make the most of this opportunity: engage actively in the sessions, contribute to discussions, build networks, and forge new collaborations. I look forward to the vibrant exchanges, the sharing of knowledge, and the spirit of partnership that will define this conference.

Together, let us shape the future of computing and contribute to a world that is smarter, more connected, and better informed.

MESSAGE FROM THE CONFERENCE CO-CHAIRS



Dr. Randil Pushpananda

*Department of CIS
University of Colombo School of Computing
University of Colombo, Sri Lanka*



Dr. Manjusri Wickramasinghe

*Department of CIS
University of Colombo School of Computing
University of Colombo, Sri Lanka*

It is our great pleasure to welcome you to ICTer 2025, the International Conference on Advances in ICT for Emerging Regions, proudly organized and hosted by the University of Colombo School of Computing. With a history that began in 1998 as the International Information Technology Conference (IITC) and was rebranded as ICTer in 2007, this conference has become a premier forum for advancing ICT research and practice in emerging regions.

A distinguishing feature of ICTer is the publication opportunity it offers. Selected high-quality papers will be considered for publication in Springer's Communications in Computer and Information Science (CCIS) series, providing authors with a platform to share their work with a global audience and contribute to the advancement of ICT knowledge.

This year's programme features a rich blend of keynote addresses, technical paper presentations, and a dedicated industry track where leading professionals will showcase research and innovations from industry. By integrating academic excellence with industry insights, ICTer fosters meaningful dialogue and collaboration that drive real-world impact.

We warmly encourage all participants to actively engage, exchange ideas, and build connections that inspire new research directions and partnerships. We are confident that ICTer 2025 will provide you with both a rewarding academic experience and valuable networking opportunities.

On behalf of the organizing committee, we extend our heartfelt welcome to ICTer 2025 and wish you a productive and inspiring conference.

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PROGRAMME

19th November 2025

7.30 am – 8.00 am	Registration
8.00 am – 8.30 am	Inauguration and Introduction of ICTer 2025
8.30 am – 8.40 am	Welcome Address <i>Dr. Randil Pushpananda, Conference Co-Chair</i>
8.40 am – 8.50 am	Address by the UCSC Director <i>Dr. Ajantha Athukorala</i>
8.50 am – 9.00 am	Address by the Vice-Chancellor <i>Prof. Indika Karunathilake</i>
9.00 am – 10.00 am	Keynote Address – I <i>Daniel Johansson, Chief Technical Security Officer, Cambio Healthcare</i>
10.00 am – 10.30 am	Tea Break
10.30 am – 12.00 pm	Paper Presentation Session 1
12.00 pm – 1.00 pm	Lunch Break
1.00 pm – 2.00 pm	Keynote Address – II <i>Prof. Kasun De Zoysa, University of Colombo School of Computing</i>
2.00 pm – 3.30 pm	Industry Track - Extended Abstract Presentations
3.30 pm – 3.45 pm	Tea Break
4.00 pm	Day one concluding ...

20th November 2025

7.30 am – 8.00 am	Registration
8.00 am – 8.15 am	Commencement
8.15 am – 9.30 am	Paper Presentation Session 2
9.30 am – 10.15 am	Keynote Address – III <i>Prof. Thiemo Voigt, Uppsala University, Sweden</i>
10.15 am – 10.45 am	Tea Break
10.45 am – 11.00 am	Platinum Sponsor Talk
11.00 am – 12.00 pm	Paper Presentation Session 3
12.00 pm – 1.00 pm	Lunch
1.00 pm – 3.30 pm	Paper Presentation Session 4
3.30 pm – 3.35 pm	Finale and Next Year Promo Video
3.35 pm – 4.00 pm	Tea Break
4.00 pm	Awards Ceremony and Vote of Thanks

INTRODUCTION TO THE KEYNOTE SPEAKER – I

Daniel Johansson

*Chief Technical Security Officer
Cambio Healthcare
Sweden*



Daniel Johansson is the Chief Technical Security Officer at Cambio Healthcare, where he oversees application security across the company's comprehensive enterprise healthcare product suite. With more than 15 years of experience as a software developer and solutions architect, Daniel has built secure, high-performance systems in both High Performance Computing and the Automotive Industry.

ABSTRACT OF THE KEYNOTE ADDRESS – I

AI and CyberSecurity – A Double-Edged Sword

Daniel Johansson

Cambio Healthcare, Sweden

AI now writes convincing phishing emails, maps entire networks, crafts and refines malware, and automates complex hacking processes. Yet, the very same technologies are also being used to strengthen defenses to sift through massive security logs, tighten access controls, detect anomalies, and predict potential breaches before they occur.

This keynote explores how generative and predictive AI models are amplifying both cyber offense and defense. The session will unpack how attackers and defenders are leveraging AI today, what tools and techniques are emerging, and what the latest research and industry reports reveal about this rapidly evolving landscape.

Finally, the talk will look ahead offering insights and predictions on how AI will reshape cybersecurity in the near future, and how organizations can prepare to harness its power responsibly while mitigating its risks.

INTRODUCTION TO THE KEYNOTE SPEAKER – III

Professor Thiemo Voigt

*Department of Electrical Engineering
Uppsala University
Sweden*



Thiemo Voigt is a full professor at the Department of Electrical Engineering at Uppsala University, Sweden, where he leads the division of Networked Embedded Systems. He is also a senior researcher at RISE Computer Science. His current research interests include low-power networking, system software and machine learning for embedded networked devices and the Internet of Things as well as in-body communication and 6G Ambient IoT. His work has been cited more than 22000 times. He has received three best paper awards in the last two years and given eight international keynotes during the same period. He is a member of the editorial board for the ACM Transactions on Sensor Networks (TOSN).

ABSTRACT OF THE KEYNOTE ADDRESS – III

Towards 6G Ambient IoT with Backscatter and Intermittent Computing

Professor Thiemo Voigt

Uppsala University and RISE

6G Ambient IoT is expected to enable a wide range of new IoT applications across various industries, driven by the ability to deploy and manage billions of interconnected devices.

6G Ambient IoT devices rely on energy harvesting rather than batteries which makes ultra-low power consumption a key issue. To address this challenge, 6G Ambient IoT devices use backscatter communication which reduces the energy consumption by several orders of magnitudes compared to conventional active radios. As the telecommunications industry drives the development of 6G, the primary focus remains on efficient communication. In this talk, I first present some key technologies of 6G Ambient IoT. I will discuss harmonic backscatter, an approach that avoids self-interference between the carrier and data radio frequency waves. I will then present TaDA, a task decoupling architecture for energy harvesting devices and discuss its potential role in 6G Ambient IoT.

LIST OF ABSTRACTS

Advanced modeling of inflation dynamics in Sri Lanka: A comparative analysis of Statistical, Machine Learning, Deep Learning, and Hybrid Forecasting approaches <i>H. N. Kudagama, S. Viswakula, S. Mathara Arachchi, S. A. C. J. Siriwardhana</i>	553
Genetic algorithm based Deep Time Series Similarity Searching approach for Acoustic Fingerprinting <i>C. Rathnayake, M. Wickramasinghe, I. Nanayakkara, R. Abeyweera, P. Marasinghe</i>	554
Balancing Privacy and Performance in Federated Learning with Adaptive Differential Privacy and Secure Multi-Party Computation <i>T. D. Attygalle, A. Athukorala</i>	555
Leveraging unintentional Electromagnetic Emissions for Radio Tomographic Imaging <i>O. Wickramasinghe, A. Sayakkara, C. Keppitiyagama, T. Voigt</i>	556
Creating Digital Estampages of Sri Lankan stone inscriptions using Multispectral Imaging <i>M. W. M. B. De Silva, M. S. Kariyawasam, A. J. U. Dakshika, K. Gunawardana, T. Wijethilake</i>	557

Advanced modeling of inflation dynamics in Sri Lanka: A comparative analysis of Statistical, Machine Learning, Deep Learning, and Hybrid Forecasting approaches

H. N. Kudagama^{1,2}, S. Viswakula¹, S. Mathara Arachchi², S. A. C. J. Siriwardhana³

¹*Department of Statistics, Faculty of Science, University of Colombo, Sri Lanka*

²*University of Colombo, School of Computing, Sri Lanka*

³*Central Bank of Sri Lanka*

Inflation is one of the most important factors that impact the economic activities of a country. Inflation forecasting plays a key role in the process of monetary policy formulation at central banks. Previous studies in Sri Lanka have focused mainly on Traditional Time Series (TTS) and Machine Learning (ML) models, while Deep Learning (DL), ensemble, and hybrid approaches with systematic hyperparameter optimization remain largely unexplored. Moreover, prior research has not incorporated recent economic shocks, such as the COVID 19 pandemic and the 2022 economic crisis. This study provides a comprehensive analysis of univariate one-step-ahead inflation forecasting using diverse modeling approaches. TTS models, including Auto Regressive Integrated Moving Average (ARIMA) and Seasonal ARIMA (SARIMA), were benchmarked against ML models [Random Forest, XGBoost, Support Vector Regression (SVR)] and DL models [Feedforward Neural Networks (FNN), Long Short-Term Memory (LSTM), Convolutional Neural Networks (CNN)]. Hybrid approaches were explored, including simple and weighted averaging ensembles, where weights were based on evaluation metrics, and residual-based hybrid models (SVR-CNN, SVR-LSTM, SVR-FNN), where SVR generates initial predictions and DL models capture residual patterns. All models were optimized using the Optuna hyperparameter tuning framework with time series cross validation. Monthly Colombo Consumer Price Index (CCPI) headline inflation data from January 2000 to March 2025 were used. Models were evaluated using RMSE, MSE, MAE, and R^2 . Various train-test splits (70:30, 80:20, 90:10) were tested, with 90:10 performing best. While SARIMA captured seasonality effectively, ML and DL models improved forecasting accuracy, and error weighted ensemble models, including the MAE-weighted ensemble, the RMSE weighted ensemble, the MSE-weighted ensemble, and the simple averaging ensemble model, further enhanced forecasting performance. While the MAE weighted ensemble model slightly outperformed the others in numerical error metrics, the Diebold-Mariano test indicated that the proposed simple average ensemble model and error-based weighted average ensemble models provided competitive performance in one-step-ahead inflation forecasting in Sri Lanka.

Keywords: *Inflation forecasting, Machine Learning, Time Series, Hybrid models*

Genetic algorithm based Deep Time Series Similarity Searching approach for Acoustic Fingerprinting

C. Rathnayake, M. Wickramasinghe, I. Nanayakkara, R. Abeyweera, P. Marasinghe

University of Colombo School of Computing, Colombo, Sri Lanka

With the exponential growth in music consumption, the demand for robust audio identification systems has intensified, especially for copyright detection and content-based retrieval. Acoustic fingerprinting, which identifies audio using unique spectral features, is a core technique in this domain. In this study, we propose a novel Deep Time Series Similarity Searching (DTSSS) framework for audio fingerprinting, leveraging a Long Short-Term Memory (LSTM)-based Siamese Neural Network. A key innovation of this work is the integration of a Genetic Algorithm (GA) to optimize hyperparameters critical to model performance. To enhance robustness, audio degradations such as noise, pitch, and tempo alterations were applied during data augmentation. The proposed system significantly outperforms the Shazam algorithm, achieving an accuracy of 64.44% compared to Shazam's 21.22% on the same dataset of degraded audio. This result highlights the potential of combining deep learning with evolutionary optimization for high-fidelity, real world audio retrieval systems.

Keywords: *Music information retrieval, Acoustic fingerprinting, Genetic algorithm, Hyperparameter optimization*

Balancing Privacy and Performance in Federated Learning with Adaptive Differential Privacy and Secure Multi-Party Computation

T. D. Attygalle, A. Athukorala

University of Colombo School of Computing, Sri Lanka

Federated Learning (FL) enables collaborative model training without sharing raw data, but exchanged updates remain vulnerable to inference attacks. While Differential Privacy (DP) adds noise to protect privacy, client-side noise in methods like Adaptive DP-FL introduces high variance and relies on server trust. Secure Multi-Party Computation (SMPC) safeguards updates via secret sharing but lacks integration with differential privacy. We propose a hybrid FL framework combining adaptive DP-FL with SMPC. Clients clip gradients adaptively and secret-share updates across non-colluding servers. Servers reconstruct only the global sum, add a single calibrated Gaussian noise term, and account privacy using R'enyi DP. This design reduces sensitivity by $1/K$, cuts noise variance, and streamlines privacy accounting. Experiments on MNIST and Fashion-MNIST under varying budgets show improved accuracy over the baseline, demonstrating enhanced privacy–utility trade-offs for sensitive applications.

Keywords: *Federated Learning, Differential Privacy, Secure Multi-Party Computation, Shamir's Secret Sharing, R'enyi Differential Privacy*

Leveraging unintentional Electromagnetic Emissions for Radio Tomographic Imaging

O. Wickramasinghe¹, A. Sayakkara¹, C. Keppitiyagama¹, T. Voigt²

¹*University of Colombo School of Computing, Sri Lanka*

²*Uppsala University, Uppsala, Sweden*

Radio Tomographic Imaging (RTI) is a promising technique for imaging non-line-of-sight areas. RTI uses radio frequency signals to create a map of the area of interest (AoI) by analyzing changes in signal strength caused by the presence or movement of objects within a network of wireless transmitters and receivers. However, current implementations require complex setups with multiple transceivers and costly, dedicated radio circuits. These systems are difficult to use in embedded and IoT applications and are highly sensitive to terrain and surface structure variations, which can significantly impact signal propagation. We investigate an alternative approach that exploits the unintentional electromagnetic (EM) emissions from computing devices to detect the effect of a human presence on the link between the device and the antenna. We conduct experiments in three different environments with a stationary person in the link using EM emissions of a single desktop PC with an Intel i5-7400 CPU. Our results demonstrate that an object in line of sight between the signal source and the receiver causes variations in the received signal from 0.65 to 3.52 dB, dependent on the AoI and the surroundings. Our results also show that changes can be detected up to 2.4 m from the signal source in a cluttered indoor environment and up to 3 m in an outdoor environment. Our findings further indicate that unintentional EM emissions from electronic devices can enable passive human detection without the need for purpose-built transmitters. Therefore, our approach can be extended to RTI.

Keywords: *Radio Tomography, Electromagnetic emissions, Far field antenna, HackRF*

Creating Digital Estampages of Sri Lankan stone inscriptions using Multispectral Imaging

M. W. M. B. De Silva, M. S. Kariyawasam, A. J. U. Dakshika, K. Gunawardana,
T. Wijethilake

University of Colombo School of Computing, Colombo, Sri Lanka

Stone inscriptions are of immense historical and cultural importance, but are progressively becoming illegible due to natural weathering, erosion and vandalism. This paper presents a novel approach to enhance the readability of stone inscriptions using multispectral imaging. Traditional methods such as estampages are weather-dependent and prone to human error. The proposed multispectral imaging-based system combines advanced techniques such as spectral enhancement based on Kubelka–Munk theory, multispectral band selection, and deep learning–based preprocessing models (U-Net, ResNet) to significantly improve legibility, providing a non-invasive and efficient method for documenting and preserving ancient inscriptions. Results demonstrate that our U-Net–based preprocessing pipeline achieved a Peak Signal-to-Noise Ratio (PSNR) of 15.33 dB and reduced Fréchet Inception Distance (FID) to 518, while expert evaluation showed a 58.7% preference for digital estampages over traditional methods. This demonstrates the system’s potential for integration into existing archaeological workflows, improving both accuracy and time efficiency in inscription documentation.

Keywords: *Multispectral imaging, Epigraphy, Stone inscriptions, Digital estampages, Archaeology, Archaeological documentation*

INSTITUTE OF AGRO-TECHNOLOGY AND RURAL SCIENCES (UCIARS)



**International Symposium on Agro Technology and Rural Sciences
(ISATRS 2025)**

***Innovative Agro Technologies for a Climate Smart and
Sustainable Future***

26th June 2025

MESSAGE FROM THE DIRECTOR/ SYMPOSIUM CHAIR

Professor D. M. C. C. Gunathilake

*University of Colombo Institute for Agro-Technology
and Rural Sciences (UCIARS)
Weligatte, Hambantota
Sri Lanka*



It is with great pride and enthusiasm that I deliver this message as the Director of the University of Colombo Institute for Agro-Technology and Rural Sciences (UCIARS), on the occasion of the Inaugural International Symposium on Agro Technology and Rural Sciences (ISATRS 2025). This year marks a historic transformation as we elevate our national platform to the international stage, under the highly relevant theme “Innovative Agro Technologies for a Climate Smart and Sustainable Future.”

Amidst growing global concerns over climate change, food insecurity, and the stagnation of agricultural productivity, the need for innovative, climate-smart solutions has become more urgent than ever. While the yields of key crops remain limited, the pressure on land and natural resources continues to escalate. In this scenario, advancing technology and research are not just options—they are necessities.

By transitioning from a national to an international symposium, ISATRS 2025 expands its horizons, welcoming a broader network of researchers, academics, and practitioners from around the globe. This platform is now poised to foster cross-border collaboration, promote diverse perspectives, and stimulate dialogue on globally relevant agricultural innovations and sustainable rural development.

ISATRS 2025 continues to prioritize the contributions of young academics, researchers, and students by providing them with a vibrant forum to present their research, share ideas, and connect with global thought leaders. UCIARS remains steadfast in its mission to facilitate knowledge sharing, technology development and transfer, product innovation, and the nurturing of agro-entrepreneurial talent that contributes to the agricultural advancement of Sri Lanka and the wider region.

I take this opportunity to extend my sincere appreciation to the organizing committee, our distinguished keynote speakers, international and local presenters, and all participants for their valuable contributions. I wish ISATRS 2025 resounding success and look forward to the collaborative energy it will spark across borders and disciplines.

MESSAGE FROM THE CO-CHAIR

Dr. N. P. Vidanapathirana

*Head, Department of Agro Technology
University of Colombo Institute for Agro-Technology and Rural
Sciences (UCIARS)
Weligatte, Hambantota
Sri Lanka*



It is with great honor and privilege that I convey this message on the occasion of the first International Symposium on Agro-Technology and Rural Sciences (ISATRS 2025), held under the theme “*Innovative Agro-Technologies for a Climate-Smart and Sustainable Future.*” This symposium marks a significant milestone for UCIARS as we extend our national symposium series to an international platform, bringing together researchers, practitioners, and stakeholders from around the world.

The primary purpose of ISATRS 2025 is to provide a forum for presenting cutting-edge research, exchanging knowledge, and formulating future collaborative programs that address the urgent challenges of agriculture in both national and global contexts. With the diversity of themes and expertise represented, this symposium will play a pivotal role in achieving our shared mandate of advancing sustainable agricultural practices and rural development.

I deeply appreciate the hard work and dedication of the organizing, scientific, technical, and financial committees, whose tireless efforts have made this event possible. My sincere gratitude also extends to the esteemed keynote speakers, session chairs, reviewers, and all contributors who have enriched this symposium with their knowledge and commitment.

On behalf of the organizing committee, I extend my heartfelt thanks to our distinguished Chief Guest, Professor L. M. Karunathilake, Vice-Chancellor of the University of Colombo, and our Guest of Honour, Mr. Harvinder Singh, Consul General of India at Hambantota, for gracing this event with their presence and support. Above all, I thank the presenters and participants for sharing their research, insights, and innovations, which form the core of ISATRS 2025.

I warmly congratulate the organizing committee for their remarkable efforts and wish ISATRS 2025 every success in creating impactful outcomes for the future of agriculture and rural sciences.

ORGANIZING COMMITTEE

Symposium Chair	Prof. D. M. C. C. Gunathilake (Director, UCIARS)
Co-Chair	Dr. N. P. Vidanapathirana (Senior Lecturer, Department of Agro Technology, UCIARS)
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Mr. S. A. R. Lakmal (IT and Publication, UCIARS)

Mr. P. B. Darshana (IT and Publication, UCIARS)

SYMPOSIUM PROGRAMME

8.00 am – 8.05 am	Lighting of the Oil Lamp
8.05 am – 8.10 am	Welcome Address <i>Mr. B. P. Siriwardana/Symposium Coordinator</i>
8.10 am – 8.15 am	Inauguration Address <i>Prof. Champathi Gunathilaka/Symposium Chair</i>
8.15 am – 8.25 am	Address by the Chief Guest <i>Prof. I. M. Karunathilake</i> <i>Vice-Chancellor, University of Colombo</i>
8.25 am – 8.55 am	Keynote Address – I <i>Prof. Ignacio Lopez Campbell</i> <i>Associate Professor in Pasture Ecology</i> <i>School of Agriculture and Environment, Massey University</i> <i>New Zealand</i>
8.55 am – 9.00 am	Short Video <i>“The Journey of UCIARS”</i>
9.00 am – 9.30 am	Keynote Address – II <i>Dr. Sandeep Mann</i> <i>Principal Scientist (Agricultural Structures & Process Engineering)</i> <i>Indian Council of Agriculture Research</i>
9.30 am – 9.45 am	Address by the Guest of Honour <i>Mr. Shri Harvinder Singh</i> <i>Consul General of India at Hambantota</i>
9.45 am – 9.50 am	Vote of Thanks <i>Dr. B. S. Bandusekara</i> <i>Symposium Secretary</i>
10.30 am – 4.00 pm	Technical Sessions

INTRODUCTION TO THE KEYNOTE SPEAKER – I

Professor Ignacio F. Lopez

*Associate Professor in Pasture Ecology
School of Agriculture and Environment
Massey University
New Zealand*



Professor Ignacio Fernando López is a distinguished academic in pasture ecology and sustainable agriculture with over 30 years of experience in research, teaching, and academic service. Since 2015, he has served as Associate Professor at Massey University, New Zealand, following an impactful academic career at the Universidad Austral de Chile. He obtained his Ph.D. in Plant Science from Massey University in 2000.

His scholarly contributions include over 84 peer-reviewed journal articles, 12 book chapters, and numerous presentations at international conferences. His research focuses on species diversity in pastures, strategic nitrogen fertilization, plant–soil–water interactions, and pasture resilience under drought stress, topics of global significance in the context of climate change.

Professor López has successfully led and collaborated on several competitive research projects, supervised many postgraduate and undergraduate students, and continues to mentor young researchers worldwide. He also serves as a Ph.D. examiner for leading universities in New Zealand and abroad, shaping the next generation of plant and pasture scientists.

A tireless advocate for linking ecological knowledge with agricultural innovation, Professor López’s work has had a profound impact on pasture-based farming systems across temperate and tropical regions. We are privileged to welcome Professor Ignacio Fernando López to deliver the first keynote address of ISATRS 2025 and eagerly anticipate the valuable insights he will share.

ABSTRACT OF THE KEYNOTE ADDRESS – I

Can Pasture Species Morphophysiology Help Mitigate Climate Change Negative Effects on Pasture Growth?

Professor Ignacio F. López

*Associate Professor in Pasture Ecology, School of Agriculture and Environment
Massey University, New Zealand*

The keynote presentation at the 1st International Symposium on Agro-Technology and Rural Sciences (ISATRS) addressed the critical challenge of climate change and its implications for pasture-based livestock systems. Prof. Ignacio F. López highlighted that managing pasture species morphophysiology offers a practical pathway to mitigate negative impacts on forage production and animal systems. Drawing from research in Chile and New Zealand, the presentation emphasized the benefits of *diverse pastures of complementary species (DPCS)* including ryegrass, pasture brome, cocksfoot, and white clover. These mixtures, with varied functional traits and growth rhythms, enhance adaptation to seasonal variability and soil water constraints. Deep-rooted summer-active species maintain growth during drought, while shallow-rooted winter-active species ensure productivity in cooler months, securing year-round stability. A key focus was the *Leaf Stage Window of Opportunity (LSWO)*, a field-based indicator aligning grazing with species-specific growth stages. LSWO optimizes regrowth, conserves plant reserves, improves resource-use efficiency, and reduces seasonal feed gaps, thereby strengthening resilience. The keynote underscored that functional diversity is not only an ecological principle but also a climate-smart practice. By integrating species with complementary traits, farmers can achieve over yielding effects, consistent feed supply, and improved resilience to climate extremes. Ultimately, bridging plant science, agroecology, and farm management will transform pasture-based systems, ensuring sustainable production, food security, and rural livelihood resilience.

INTRODUCTION TO THE KEYNOTE SPEAKER – II

Dr. Sandeep Mann

*Head AS & EC, Principal Scientist
Indian Council of Agriculture Research
India*



Dr. Sandeep Mann is a distinguished scientist in agricultural engineering and post-harvest technology. He currently serves as the Principal Scientist in the Transfer of Technology Division at the ICAR–Central Institute of Post-Harvest Engineering & Technology (CIPHET), Ludhiana.

He earned his M.Tech. from Chaudhary Charan Singh Haryana Agricultural University, Hisar, and Ph.D. in Processing and Food Engineering from Punjab Agricultural University, Ludhiana. His academic excellence was evident early in his career, as he was awarded the Gold Medal for his B.Tech. in Agricultural Engineering in 1997.

With over 22 years of service in India’s National Agricultural Research System, Dr. Mann has made significant contributions to post-production process mechanization and value addition. His research spans agricultural processing machinery, environment control structures, packaging and storage solutions, mathematical modeling, expert systems, modified atmosphere packaging, and mechanization of traditional foods.

He has played a pivotal role in developing impactful technologies such as seed processing plants, on-farm fresh produce handling units, evaporative cool chambers, taro and potato peelers, corn cob roasters, animal lifters, and high-volume low-speed fans for dairy animals.

Dr. Mann is also a prolific academic, with over 58 publications, including research papers, book chapters, and technical manuals. He has taught extensively, mentoring eight Master’s students and three Ph.D. scholars. His work has been recognized with several honours, including the ISAE Team Award, Commendation Medal, and the MASHAV Fellowship of Israel (2012). A visionary scientist, Dr. Mann continues to lead innovations in post-harvest technologies, empowering farmers, both growers and entrepreneurs, thereby advancing rural livelihoods and agro-industrial development.

LIST OF ABSTRACTS

TRACK: CROP SCIENCE AND EMERGING TECHNOLOGIES FOR SUSTAINABLE AGRICULTURE

- Influence of growing media and planting techniques on the Growth of young budding rubber plants under nursery conditions**
K. K. L. S. Chandrasena, S. A. Nakandala, U. N. Udayakumari, B. S. Bandusekara 571
- Effects of variable seed rates and potassium levels on yield components and quality parameters of Basmati Type No. 06 rice in Sri Lanka**
H. M. K. G. S. S. K. Herath, N. V. T. Jayaprada, W. S. Priyantha 572
- Increasing nitrogen use efficiency in rice using nitrate and ammonia inhibitors**
W. L. Nawanjana, N. V. T. Jayaprada, W. S. Priyantha 573
- Evaluating the effect of different fertilizer formulations on pod filling in the groundnut variety “Lanka Jumbo”**
K. H. M. S. S. Vijesuriya, U. A. J. Ratnayaka, A. J. M. C. M. Siriwardana, L. M. Rifnas 574
- Impact of different concentrations of gibberellic acid on the growth and yield of rice (*Oryza sativa* L.) under Low Country Dry Zone of Sri Lanka**
D. W. N. Madhushika, S. L. Nawarathna, M. H. U. Siriwardena, K. H. C. H. Kumara 575
- Optimization of carbon-to-nitrogen ratios and assessing salinity tolerance in *Metarhizium* spp. for biofertilizer development in *Vigna unguiculate* cultivation**
W. D. M. H. Perera, W. P. T. D. Perera, T. Jayakody 576
- Selection of suitable rootstock for cucumber (*Cucumis sativus*) cultivation grown under protected house condition**
K. K. Heenkenda, K. M. S. Kodikara, K. G. Ketipearachchi, P. B. D. Jeewanthi, B. P. Siriwardena 577
- Effect of ammonium sulphate application on chemical and physical properties in cinnamon growing soils**
G. S. Malshani, K. H. G. M. Tharanga, B. S. Bandusekara, U. M. U. R. Ariyasoma 578
- Assessment of growth and yield traits of novel mushroom strains (*Pleurotus* spp.) for commercial cultivation**
T. H. S. Sujeewa, P. B. D. Jeewanthi, W. M. P. S. Gunasekara, N. P. Vidanapathirana 579
- Single-stage chili milling for improved energy efficiency through brittleness enhancement**
R. W. M. K. S. Dilrukshi, K. S. P. Amaratunga, D. M. C. C. Gunathilake 580

TRACK: ADVANCING FOOD SECURITY, NUTRITION, AND POST-HARVEST TECHNOLOGIES

Development of instant Biryani Full Meal Pack as Meal for Ready to Eat (MRE) <i>M. H. H. Ahamed, A. J. M. C. M. Siriwardana, L. M. Rifnas, D. M. H. C. Dissanayake</i>	581
Formulation and standardization of natural liquid soap using palmyrah (<i>Borassus flabellifer</i>) fruit pulp and butterfly pea flower (<i>Clitoria ternatea</i>) <i>T. Kajan, B. S. Bandusekara, A. Balasubramaniyam</i>	582
Development of spicy masala biscuit enriched with cavendish banana blossom (<i>Musa acuminata</i>) flour by mitigating the bitterness <i>R. M. D. P. Rathnayaka, B. S. Bandusekara, P. L. N. Lakshman</i>	583
Development of a fictional beverage from coffee pericarp and roasted coffee blends of <i>Coffea arabica</i> <i>P. Abijah, H. A. P. W. Hettiarachchi</i>	584
Quality and sensory evaluation of different aromatic rice varieties for rice milkshake production <i>L. P. R. V. Piyumali, M. H. U. Siriwardana, J. A. N. Gimhani</i>	585
Quantification of caffeine and 5-Caffeoylquinic Acid (5CQA) in seven European commercial roasted coffees (<i>Coffea arabica</i>) using HPLC-PDA <i>U. R. Chandimala, Z. Ajtony</i>	586

TRACK: INNOVATIONS IN SUSTAINABLE LIVESTOCK, AQUACULTURE, AND HEALTH

Rice farmer's perception and knowledge on rice- fish integration in some selected areas of Kurunegala District <i>R. M. S. U. Rajapaksha, H. K. R. S. Kumara</i>	587
Knowledge, perception and constraints of the food fish farmers and traders on Rice- Fish Integration in Kurunegala District <i>N. A. D. P. A. Samaranayaka, H. K. R. S. Kumara</i>	588
Diverse Pastures of Complementary Species (DPCS) to buffer dry summer conditions: A Review <i>R. Liyafudeen, I. F. López, L. Cranston, N. López-Villalobos, A. Cartmill, B. A. Oliveira, I. P. Ordóñez, J. García-Favre, J. Dörner</i>	589
Influence of fertilizer type and plant spacing on morphological characteristics and forage yield of <i>Brachiaria</i> hybrid Mulato II in the Dry Zone Sri Lanka <i>M. G. I. D. Munasingha, B. S. Bandusekara, J. G. N. D. Jayasinghe</i>	590

TRACK: AGRIBUSINESS, POLICY, AND RURAL TRANSFORMATION

Formulation of herbal dry shampoo powder using palmyrah (<i>Borassus flabellifer</i>) tender leaves <i>S. Thilaksha, D. M. C. C. Gunathilake, A. Balasubramaniyam</i>	591

TRACK: CROP SCIENCE AND EMERGING TECHNOLOGIES FOR SUSTAINABLE AGRICULTURE

Influence of growing media and planting techniques on the growth of young budding rubber plants under nursery conditions

K. K. L. S. Chandrasena¹, S. A. Nakandala², U. N. Udayakumari², B. S. Bandusekara¹

¹*Department of Agro-technology, University of Colombo Institute for Agro-Technology and Rural Sciences, Hambantota, Sri Lanka*

²*Rubber Research Institute of Sri Lanka, Dartonfield, Agalawatta, Sri Lanka*

Physical, chemical, and biological characteristics of the growing medium significantly influence the growth and development of young rubber plants. In many rubber nurseries, the availability of fertile topsoil is limited due to the repeated establishment of large-scale nurseries in the same area over extended periods and therefore, nursery operators often resort to using subsoil as a growing medium, which is high in clay, low in organic carbon, and exhibits poor physical structure. Although their chemical fertility can be enhanced through the application of fertilizers, unfavorable soil physical properties continue to hinder optimal plant growth. Therefore, this study is based on enhancing the quality of the potting medium, along with the adoption of improved planting techniques. An experiment was conducted in a rubber nursery with 5000 plants using a Randomized Complete Block Design with two factors: five growing media (T1 – Soil mixture (control), T2 - Soil mixture: Coir pith=1:1, T3 - Soil mixture: Burnt Rice Husk=1:1, T4 - Soil mixture: Coir pith: Burnt Rice Husk=2:1:1, T5 - Soil mixture: Coir pith: Compost=2:1:1) and two planting techniques (trench planting with coir pith (WC) and trench planting without coir pith (WOC)). Growth attributes, i.e., stem diameter, plant height, leaf area, root length, chlorophyll content, and stomatal conductance were measured throughout the period. Dry matter analysis was done using standardized methods. The results revealed significant ($p \leq 0.05$) variation in plant growth attributes under different treatments and planting techniques. Coir-based media, particularly T2 (coir pith: soil) and T5 (coir pith: compost: soil), promoted larger leaf area (2890.5 cm²) and greater stem diameter (7.8mm), enhancing shoot and leaf growth. The T3 (coir: rice husk) mixture was particularly effective in root development, producing the longest taproots and highest root weights. Trench planting with coir pith consistently yielded higher growth compared to WOC. Additionally, coir-based media demonstrated 25% - 27% water retention, making them ideal for water-scarce environments. These findings suggest that coir-based growing media and trench planting techniques are practical and efficient solutions for enhancing plant growth, making them valuable strategies for optimizing nurseries in challenging environments.

Keywords: *Coir pith, Growth attributes, Growing media, Rubber, Water retention*

Effects of variable seed rates and potassium levels on yield components and quality parameters of Basmati Type No. 06 rice in Sri Lanka

H. M. K. G. S. S. K. Herath¹, N. V. T. Jayaprada¹, W. S. Priyantha²

¹*Department of Agricultural Technology, Faculty of Technology, University of Colombo, Sri Lanka*

²*Rice Research and Development Unit, CIC Seed Farm, Pelwehera, Dambulla, Sri Lanka*

Basmati rice is known for its fragrance, long grains, and excellent cooking qualities. This study was conducted to identify the suitable seed rate and potassium fertilizer combination to achieve the maximum grain yield and quality of Basmati type No.06 rice variety. A field experiment was carried out at CIC seed farm, Pelwehera, Sri Lanka from May 2024 to August 2024. The study had nine treatments (T1- 45 g/plot + Department of Agriculture recommended Muriate of Potash [DoA MoP], T2- 45 g/plot + 1 ½ DoA MoP, T3 – 45 g/plot + no MoP, T4 – 90 g/plot + DoA MoP, T5 – 90 g/plot + 1 ½ DoA MoP, T6 – 90 g/plot + no MoP), T7 – 135 g/plot + DoA MoP - control, T8 – 135 g/plot + 1 ½ DoA MoP and T9 – 135 g/plot + no MoP) in a Randomized Complete Block Design (RCBD) with three plot replications with a plot area of 18 m². Based on the ANOVA results, selected combinations of seed rates and MoP levels did not have a significant effect ($p>0.05$) on vegetative growth and actual yield. The effect was significant ($p<0.05$) on grain quality characters. A moderate seed rate of 90 g per plot (one bushel per acre) combined with 1½ of the DOA recommended MOP had the best performance in terms of grain physical quality, with a significant ($p<0.05$) maximum grain length (8.04±0.05 mm). It also showed superior milling quality, with a significant ($p<0.05$) higher head grain percentage (35.03±0.37 %) and a significant ($p<0.05$) lower broken grains percentage (33.56±0.45 %), along with excellent cooking quality, including a significant ($p<0.05$) longer grain length after cooking (12.23±0.03 mm) and an elongation ratio of 1.52±0.01. Based on these findings, the study concludes that using a 90g seed rate per plot (one bushel per acre) with 1½ of the DOA recommended MOP is the optimal combination to achieve maximum yield and quality for Basmati type no. 06 rice variety. However, the research should be replicated and tested in other agro-ecological zones in Sri Lanka during both *Yala* and *Maha* seasons to validate the findings.

Keywords: *Basmati rice, Grain quality, Grain yield, Potassium (K) fertilizer, Seed rate*

Increasing nitrogen use efficiency in rice using nitrate and ammonia inhibitors

W. L. Nawanjana¹, N. V. T. Jayaprada¹, W. S. Priyantha²

¹*Department of Agricultural Technology, Faculty of Technology, University of Colombo, Sri Lanka*

²*Rice Research and Development Unit, CIC Seed Farm, Pelwehera, Dambulla, Sri Lanka*

Nitrogen fertilizer loss in rice fields, through processes like denitrification, volatilization, and leaching, leads to reduced nitrogen use efficiency (NUE). Nitrogen inhibitors are added to nitrogen-based fertilizers to reduce losses, by slowing down the conversion of nitrogen to forms susceptible to loss. This study was conducted to evaluate the NUE of three selected nitrogen inhibitors in rice variety Bg 352. A field experiment was conducted from May 2024 to August 2024 at Rice research and Development unit, CIC seed farm, Pelwehera, Sri Lanka, in a randomized complete block design (RCBD) with seven treatments each with three replicates. The treatments comprised of varying nitrogen applications and three nitrogen inhibitors: T1 - 100% Department of Agriculture (DOA) recommended dose of urea (RDU), T2 - 75% RDU, T3 - 60% RDU, T4 - 60% RDU with Power nitrogen inhibitor 1 L Mt⁻¹, T5 - 60% RDU with Limus inhibitor 1 L Mt⁻¹, T6 - 60% RDU with Vibelsol inhibitor 1 L Mt⁻¹, and T7 - no urea. Based on the ANOVA results, ($p > 0.01$) the application of 60% RDU did not significantly reduce grain yield (5.53 ± 0.347 t ha⁻¹) compared to 100% RDU (6.34 ± 0.224 t ha⁻¹); however, the reduction was nearly 1 t ha⁻¹. The use of nitrogen inhibitors significantly mitigated the yield reductions caused by reduced urea applications. Among the three nitrogen inhibitors tested, Vibelsol showed the most significant results in improving nitrogen use efficiency. The results revealed that there was no significant difference ($p > 0.01$) in actual grain yield between 100% RDU (6.34 ± 0.224 t ha⁻¹) and 60% RDU (6.33 ± 0.197 t ha⁻¹) with Vibelsol inhibitor 1 L Mt⁻¹. Additionally, the 60% RDU with Vibelsol inhibitor 1 L Mt⁻¹ treatment demonstrated the highest NUE (10.26 ± 1.031). These findings suggest that using 60% RDU with Vibelsol inhibitor 1 L Mt⁻¹ is an effective strategy to enhance NUE and maintain actual grain yield which can reduce the DOA recommended urea dose by 40% while ensuring optimal yield for the Bg 352 rice variety under low-country dry zone conditions in Sri Lanka. Further research is necessary to validate these results under different environmental conditions.

Keywords: *Ammonia inhibitor, Nitrate inhibitor, Nitrogen inhibitor, Nitrogen use efficiency, Urea*

Evaluating the effect of different fertilizer formulations on pod filling in the groundnut variety “*Lanka Jumbo*”

K. H. M. S. S. Vijesuriya¹, U. A. J. Ratnayaka², A. J. M. C. M. Siriwardana¹, L. M. Rifnas¹

¹*Department of Agro-Technology, University of Colombo Institute for Agro-Technology and Rural Sciences, Hambantota, Sri Lanka*

²*Grain Legumes and Oil Crops Research and Development Centre, Angunakolapelessa, Sri Lanka*

Lanka Jumbo is a popular medium-duration jumbo peanut (*Arachis hypogaea* L.) variety released by GLORDC, Angunakolapelessa, Sri Lanka. Pod filling is a crucial phase in groundnut development, significantly affecting yield and plant health. Calcium plays a key role in pod formation, yield improvement, and nutritional quality. This study aimed to identify an optimal fertilizer mix to enhance pod filling and increase the yield of groundnut variety Lanka Jumbo. A field experiment was conducted in Rideemaliyadda, Badulla district (IL2 Agro-ecological zone), Sri Lanka, to evaluate the effectiveness of seven fertilizer treatments. The Department of Agriculture (DOA) Sri Lanka recommendation (T1 - Urea 65 kg/ha, TSP 100 kg/ha, MOP 75 kg/ha) was compared with six alternatives: a 20% increase in TSP and MOP (T2), 250 kg/ha gypsum with enhanced nutrients (T3), gypsum with the DOA recommendation (T4), DOA recommendation + 500 kg/ha Nutri Pellets compost (T5), Commercially available complex fertilizer (125 kg/ha) + Commercially available calcium nitrate and boron mix fertilizer (62.5 kg/ha) (T6), and DOA recommendation + nitrogen foliar spray (T7). Treatments were arranged in a Randomized Complete Block Design (RCBD) with three replicates. Plant height and the number of branches per plant were recorded as plant growth data at 25 and 60 days after planting, while yield parameters included the number of pods per plant, the number of filled and unfilled pods per plant, and the dry weight of 100 seeds. No significant differences in plant growth were observed among treatments at 60 days after planting, although T7 recorded the highest plant height (58.7 cm) and number of branches (9.6). T4 showed the best yield performance, producing 134.67 g of dry pod weight per plant, with 53.3 pods per plant, a 96.2% pod filling rate, and a 100-seed weight of 210 g. In contrast, T7 had the lowest performance, with 40.7 pods per plant and a significantly lower pod filling rate (39.3%). These findings suggest that applying 250 kg of gypsum with the DOA-recommended fertilizer mixture improves pod filling and enhances the yield of groundnut var. Lanka Jumbo.

Keywords: *Fertilizer management, Groundnut, Jambo Lanka, Peanut, Pod filling*

Impact of different concentrations of gibberellic acid on the growth and yield of rice (*Oryza sativa* L.) under Low Country Dry Zone of Sri Lanka

D. W. N. Madhushika¹, S. L. Nawarathna¹, M. H. U. Siriwardena², K. H. C. H. Kumara²

¹*Department of Agro Technology, University of Colombo Institute of AgroTechnology and Rural Sciences, Hambantota, Sri Lanka*

²*Rice Research Station, Department of Agriculture, Ambalantota, Sri Lanka*

This study focuses on identifying the optimal gibberellic acid concentration to enhance rice productivity in semi-arid conditions while identifying the impact of different concentrations of gibberellic acid on growth and yield of rice. Growth regulators, such as gibberellic acid, play a crucial role in optimizing crop growth, improving yield and mitigating the effect of environmental stress. This experiment was conducted at the rice research station in *Ambalantota* during the “*Yala*” season in 2024. The experiment utilized the At362 rice variety. The experimental design was randomized complete block design (RCBD) with four replicates, and included six gibberellic acid treatments (0 ppm, 25 ppm, 50 ppm, 75 ppm, 100 ppm, 125 ppm). In this experiment, 15 ml of gibberellic acid solution was applied to the plant. This application was done four weeks after planting. The plant was separated before application. Results indicated significant differences in plant growth parameters and yield components with the 75 ppm treatment producing the highest plant height (104.09 cm), number of tillers (7.6), and number of filled grain panicles (76.27) leading to optimal grain yield (20.60 g). Conversely, higher concentrations (100 ppm, and 125 ppm) negatively affected these parameters, resulting in reduced performance, particularly in yield. The findings highlight gibberellic acid potential as a vital plant hormone in enhancing rice growth and yield, particularly under challenging climatic conditions.

Keywords: *Dry zone, Gibberellic acid, Growth, Rice, Yield*

Optimization of carbon-to-nitrogen ratios and assessing salinity tolerance in *Metarhizium* spp. for biofertilizer development in *Vigna unguiculata* cultivation

W. D. M. H. Perera¹, W. P. T. D. Perera², T. Jayakody¹

¹Department of Chemistry, Faculty of Science, University of Colombo, Sri Lanka

²Panam Biotech (Pvt.) Ltd, Homagama, Sri Lanka

This study investigates the optimization of growth media for *Metarhizium* spp. as a multifunctional biocontrol agent and plant growth-promoting agent by examining the effect of carbon concentration and carbon-to-nitrogen (C:N) ratios on fungal growth and sporulation. The research addresses key knowledge gaps by evaluating how varying C:N ratios influence growth dynamics and spore yield, assessing its potential to alleviate salinity stress at 0, 4, 6, 8, and 10 dS m⁻¹ salinity levels using media tailored to Sri Lankan soil conditions. Additionally, the impact on cowpea (*Vigna unguiculata*) seed germination, and seedling growth was assessed under normal conditions via seed coating. Fungal growth was evaluated through radial growth, dry biomass, and spore counts. Experimental findings revealed that optimized nutrient composition, achieved by regulating C:N ratios and balanced mineral supplementation significantly influenced fungal growth and sporulation. Herein a C:N ratio of 20:1 combined with 8 g L⁻¹ carbon concentration was identified as optimal, yielding the highest spore production (327 x 10⁶ spores ml⁻¹). Seed coatings with spores produced under optimized conditions (8 g L⁻¹ carbon, C:N 20:1) significantly improved seed germination (100% vs. 60% with Xanthum gum, 40% with distilled water), shoot length (19 cm vs. 6 cm and 4 cm), root length (24 cm vs. 8 cm and 6 cm), and seedling vigour indices (SVI-I: 4300 vs. 880 and 400; SVI-II: 38,000 vs. 3200 and 1500), demonstrating substantial improvement over untreated controls. The findings demonstrated that C:N optimization boosts both the growth and sporulation efficiency of *Metarhizium* spp. as well as its functional efficacy as a plant growth promoter. This study supports the development of cost-effective and eco-friendly biofertilizers that enhance crop resilience and productivity, promoting long-term sustainable agricultural practices.

Keywords: Carbon concentration, Carbon to nitrogen ratio, *Metarhizium* spp., Sustainable agriculture, *Vigna unguiculata*

Selection of suitable rootstock for cucumber (*Cucumis sativus*) cultivation grown under protected house condition

K. K. Heenkenda¹, K. M. S. Kodikara², K. G. Ketippearachchi¹, P. B. D. Jeewanthi¹,
B. P. Siriwardena¹

¹*Department of Agro-Technology, University of Colombo Institute for Agro-Technology and Rural Sciences, Hambantota, Sri Lanka*

²*Regional Agriculture Research & Development Center, Bandarawela, Sri Lanka*

Grafting is an effective method to enhance crop growth and yield by increasing plant tolerance to root related stress. Therefore, this study was carried out to find suitable rootstock for cucumber grafting at the Regional Agriculture Research & Development Center, *Bandarawela* from March 2024 to August 2024. The experiment was designed as a Completely Randomized Design (CRD) with four replicates using four types of cucurbits as root stock in hole insertion grafting of cucumber. Each replicate consisted of 10 plants. The five treatments tested were T1: bottle gourd + cucumber, T2: pumpkin + cucumber, T3: ash pumpkin + cucumber, T4: *kakiri* + cucumber and T5: cucumber without grafting (control). Grafting success rate was evaluated 10 days after grafting. Treatments 1, 2, 3 and 4 showed 77.5%, 87.5%, 17.5%, and 0% grafting success rate respectively. Therefore, data (plant height, number of leaves per plant, total wet and dry weight of plant, wet and dry weight of shoots and roots per plant, maximum root length per plant) were recorded only in T1, T2, and T5 treatments. The data were analyzed with Minitab using ANOVA procedure at 0.05 significant levels. Plant height was measured from 10 days to 20 days after grafting. Results revealed that there was a significant difference ($p \leq 0.05$) in plant height among treatments throughout this period. Significantly higher plant height was recorded in T1 (bottle gourd + cucumber) compared to T2 and T5 treatments. However, there was no significant difference ($p \geq 0.05$) in the number of leaves per plant among treatments. Significantly higher fresh and dry weight of shoots, maximum root length, fresh and dry weight of plant was also recorded in T1 treatment compared to other treatments. Fresh and dry weight of roots were significantly higher in T1 and T2 compared to T5 treatment. Therefore, it can be concluded that bottle gourd is a suitable rootstock among tested rootstocks for successful grafting of cucumber. Further studies are needed to evaluate the performance of these plants under protected house conditions.

Keywords: *Bottle gourd, Cucumis sativus, Cucurbits, Grafting, Rootstock*

Effect of ammonium sulphate application on chemical and physical properties in cinnamon growing soils

G. S. Malshani¹, K. H. G. M. Tharanga², B. S. Bandusekara¹, U. M. U. R. Ariyasoma¹

¹*Department of Food Technology, University of Colombo Institute for Agro-Technology and Rural Sciences, Hambantota, Sri Lanka*

²*Cinnamon Research and Training Centre, Department of Export Agriculture, Thihagoda, Sri Lanka*

Cinnamon cultivation requires effective soil fertility management to maintain plant health and achieve optimal yield. In commercial plantations, continuous application of ammonium sulphate (SA) as a nitrogen source is common practice. However, the long-term effects of SA, particularly its acidifying nature, on soil properties remain underexplored. This study was conducted over a seven-year period (2016–2023) at the Cinnamon Research Station, *Thihagoda*, situated in the Low Country Wet Zone of Sri Lanka, to evaluate both short- and long-term impacts of different SA application rates on soil chemical and physical properties. Six fertilizer treatments were tested: T1 (Control) with urea alone (480 kg/ha/year); T2 to T6 with increasing SA rates (225–976 kg/ha/year) and decreasing urea rates (346–0 kg/ha/year). The experiment followed a Randomized Complete Block Design with four replicates. Soil samples were collected at two time intervals—six weeks (to assess short-term effects) and five months (for long-term effects) after fertilizer application. Sampling was performed at three lateral distances (15 cm, 30 cm, and 45 cm) and three depths (10 cm, 20 cm, and 30 cm) from the plant base. Soil parameters assessed were pH, electrical conductivity (EC), available sulfur, bulk density, moisture content, and soil colour. Data were analyzed using ANOVA to determine treatment effects. The results showed that both short- and long-term applications of SA significantly ($p < 0.05$) affected soil chemical properties. A marked decrease in soil pH was observed with increasing SA rates, with the lowest pH values recorded in T3 and T4 treatments (4.15 ± 0.47 and 4.34 ± 0.32 , respectively). EC and available sulfur levels increased significantly with higher SA applications, with the highest EC value (0.022 ± 0.98) observed in T6, where only SA was applied. Conversely, soil physical properties such as bulk density and moisture content were not significantly affected over the study period. These findings highlight the acidifying effect of prolonged SA use and underscore the need for balanced fertilizer management. The study recommends regular soil monitoring and appropriate liming practices to mitigate soil acidification and sustain long-term soil health in cinnamon plantations.

Keywords: *Cinnamon, Ammonium sulphate, Soil fertility, Chemical parameters, Physical parameters*

Assessment of growth and yield traits of novel mushroom strains (*Pleurotus* spp.) for commercial cultivation

T. H. S. Sujeewa¹, P. B. D. Jeewanthi¹, W. M. P. S. Gunasekara², N. P. Vidanapathirana¹

¹*Department of Agro-Technology, University of Colombo Institute for Agro-Technology and Rural Sciences, Hambantota, Sri Lanka*

²*Agriculture Research Station, Thelijawila, Sri Lanka*

Mushroom cultivation in Sri Lanka holds promise for improving nutrition and generating income. Despite this potential, the industry remains underdeveloped due to outdated cultivation methods, and narrow genetic base. This study evaluated the growth and yield traits of four pure mushroom strains [American Oyster (T1), Abalone (T2), China (T3), and Black Oyster (T4)] and four hybrid strains [American Oyster × Black Oyster (T5), China × Abalone (T6), China × Black Oyster (T7), and American Oyster × China (T8)] to identify candidates best suited for commercial cultivation. The experiment was conducted using a Completely Randomized Design (CRD) with 20 replicates per treatment. All strains were cultivated on a 950 g substrate mix (albizia sawdust-50 kg, rice bran-5 kg, dhal flour-500 g, calcium carbonate-1 kg, and magnesium sulfate-100 g) with moisture adjusted to 60–65%, then sterilized and inoculated under aseptic conditions. Incubation was maintained at 25±2°C and 80–85% humidity. Data on spawn run duration (days), stalk length (cm), cap diameter (cm), yield (g), and biological efficiency (BE%) were collected weekly over eight weeks from the day of inoculation and analyzed using ANOVA and Tukey's HSD test. Results showed significant differences ($p < 0.001$) among strains in spawn run duration, yield, and BE. Hybrid strain T8 had the fastest colonization (23.87±2.09 days), while T4 had the slowest (49.45±8.71 days). T6 recorded the highest yield (98.5±44.08 g) and BE (10.36±4.64%), indicating its strong production potential. In contrast, T1 recorded the lowest yield (34.32±12.97 g) and BE (3.61%), highlighting its limited commercial value. Morphological differences among strains were not statistically significant, although T6 had the longest stalks (4.85±1.75 cm) and T3 the largest caps (10.71±1.52 cm). T5 and T3 recorded the shortest stalks (3.09±0.67 cm) and smallest caps (9.74±1.63 cm), respectively. Overall, hybrid strains particularly involving the China strain out performed pure strains in both yield and biological efficiency. This suggests that hybrid vigour plays a key role in enhancing growth and productivity traits. The superior performance of specific hybrid strains underlines their potential for large-scale cultivation in Sri Lanka. However, to support industry-wide adoption, future research should assess additional traits such as nutritional content, shelf life, disease resistance, and adaptability to diverse substrates and agro-climatic zones.

Keywords: *Commercial mushroom farming, Growth performance, Mushroom strains, Yield traits*

Single-stage chili milling for improved energy efficiency through brittleness enhancement

R. W. M. K. S. Dilrukshi¹, K. S. P. Amaratunga², D. M. C. C. Gunathilake¹

¹*Institute for Agro-Technology and Rural Sciences, Hambantota, University of Colombo, Sri Lanka*

²*Department of Agriculture Engineering, Faculty of Agriculture, University of Peradeniya, Sri Lanka*

This study evaluated the potential of single-stage chili milling (SSCM) as a significantly more energy-efficient alternative than the conventional multistage milling method. The research specifically investigated the impact of reducing the chili moisture content to enhance milling efficiency by increasing material brittleness. Initial chili moisture content, ranging from 12% to 13% w.b. during storage, was effectively reduced to 3.5-4% w.b. by allowing the chili to reach equilibrium moisture content in a controlled environment of 20% relative humidity and 37°C, created using heat pump air dehumidifiers. SSCM trials were performed using a pulverizer, and the energy consumption was rigorously analyzed using classical grinding laws, including Bond, Rittinger, and Kick's laws. The results demonstrated a remarkable reduction in energy consumption for SSCM (266 kJ kg⁻¹) compared to the conventional multistage chili milling process (1116 kJ kg⁻¹). This substantial decrease is further highlighted by the significantly lower specific energy (88.65 kJ kg⁻¹ for SSCM compared to 611 kJ kg⁻¹) and Bond Work Index (BWI) (8.82 kWh t⁻¹ for SSCM compared to 255 kWh t⁻¹) observed with the single-stage method. The calculated constants for Kick's, Rittinger's, and Bond's laws consistently indicated the superior energy performance of SSCM. This study unequivocally demonstrates that controlled dehumidification as a pre-treatment significantly enhances the energy efficiency of chili milling, and the adoption of SSCM offers a compelling strategy for substantial energy savings in chili processing.

Keywords: *Chili milling, Dehumidification, Energy efficiency, Grinding laws, Moisture content, Single-stage milling*

TRACK: ADVANCING FOOD SECURITY, NUTRITION, AND POST-HARVEST TECHNOLOGIES

Development of instant Biryani Full Meal Pack as Meal for Ready to Eat (MRE)

M. H. H. Ahamed¹, A. J. M. C. M. Siriwardana¹, L. M. Rifnas¹, D. M. H. C. Dissanayake²

¹*Department of Agro-Technology, University of Colombo Institute for Agro-Technology and Rural Sciences, Hambantota, Sri Lanka*

²*Department of Food Technology, University of Colombo Institute for Agro-Technology and Rural Sciences, Hambantota, Sri Lanka*

Instant food products are convenient ready-made items specifically designed to cater to the fast-paced lifestyles of today. These products, including instant noodles, spaghetti, soups, ready-to-eat cereals, and pre-cooked rice, provide time-efficient meal solutions for those seeking quick options. Hence, a series of experiments was conducted to develop an instant biryani full meal using basmati long-grain rice, infused with flavour. The study aimed to evaluate the effects of different dehydration methods, water: rice ratio and packaging material on organoleptic and physicochemical properties. In the first experiment, the rice was conventionally cooked and then subjected to different dehydration treatments (sun drying, oven drying, and roasting) to produce instant rice. The spices were dehydrated using similar methods. In the second experiment, three different water- to-rice ratios (1:1, 1:1.25, 1:1.5) were tested with the instant biryani mix to identify the best rehydration method. Experiment three aimed to determine the best packaging material for the instant biryani mix with an emphasis on shelf life with five treatments (T1: HDPE with vacuum and freezing, T2: HDPE with vacuum, T3: LAP, T4: HDPE, and T5: LDPE). Based on the results, 1:1.5 water-to-rice ratio was selected as the optimal rehydration method, providing the closest resemblance to authentic biryani and achieving high consumer satisfaction. The results indicated a significant difference between tested packaging methods ($p < 0.05$), and T4 (HDPE packaging) emerged as the most effective. Based on the experiments, considering cost, the sun-drying method combined with HDPE packaging was found to perform better than other methods. Nutritional analysis of the meal revealed that the selected process yielded a product containing 72% carbohydrates, 15.2% protein, 5.21% fat, 2.64% salt, 4.26% ash, and provided 398.89 Kcal per 100 g serving.

.

Keywords: *Biryani, Dehydration, Instant, Rehydration*

Formulation and standardization of natural liquid soap using palmyrah (*Borassus flabellifer*) fruit pulp and butterfly pea flower (*Clitoria ternatea*)

T. Kajan¹, B. S. Bandusekara¹, A. Balasubramaniyam²

¹*Department of Agro-Technology, University of Colombo Institute for Agro-Technology and Rural Sciences, Hambantota, Sri Lanka*

²*Department of Food Science, Palmyrah Research Institute, Kaithady, Jaffna*

This study aims to develop and standardize a natural liquid soap using locally available Butterfly Pea Flower (*Clitoria ternatea*) extract (BPF) and Palmyrah Fruit Pulp (*Borassus flabellifer*) (PFP), addressing growing consumer demand for sustainable, eco-friendly, and health-conscious personal care products. Six formulations with different BPF: PFP ratios (T1:1:2, T2:1:1, T3:2:1, T4:3:0, T5:0:3, and T6:0:0) were used in the study. To identify the best formulation, sensory and physico-chemical tests (pH, Density, Lather volume, Total free alkali) were performed. Features like texture, color, foaming ability, washing ability, skin feel after washing, and general acceptance were evaluated through sensory evaluation. T2 consistently got the highest ratings across all sensory metrics, indicating its higher consumer appeal. This combination had a 1:1 ratio of BPF to PFP. Physiochemical testing confirmed the liquid soap's stability and effectiveness. Crucial metrics like pH (10.23), foaming stability (380 cm foam height), viscosity (75.42 at 60 RPM), and washing power (0.28% total free alkali) verified that the solution complied with industry requirements while remaining skin friendly. To further guarantee adherence to quality and safety standards, the formulation of liquid soaps was evaluated according to Sri Lanka Standards (SLS). T2 was the most suitable for standardization and commercialization due to its optimal sensory and physio-chemical properties. Additionally, the soap maintained its chemical and physical qualities, exhibiting a satisfactory shelf life of one year. This study highlights the feasibility of using traditional ingredients, such as BPF and PFP, in contemporary formulations to support local resource promotion and sustainable product development. This approach makes meeting customer demand for natural products possible while promoting economic and environmental sustainability.

Keywords: *Butterfly Pea Flower, Natural liquid soap, Palmyrah Fruit Pulp*

Development of spicy masala biscuit enriched with cavendish banana blossom (*Musa acuminata*) flour by mitigating the bitterness

R. M. D. P. Rathnayaka¹, B. S. Bandusekara¹, P. L. N. Lakshman²

¹*Department of Agro-Technology, University of Colombo Institute for Agro-Technology and Rural Sciences, Hambantota, Sri Lanka*

²*Department of Food Science & Technology, Faculty of Agriculture, University of Ruhuna, Sri Lanka*

Cavendish banana blossom is a rich source of dietary fiber and other bioactive materials such as vitamins, minerals, and antioxidants. Nevertheless, due to the bitterness, its nutritional potential is not satisfactorily exploited in the food industry. In large scale banana cultivations, banana blossoms are stripped by farmers, and wasted without commercial scale utilization. The objective of the present study was to reduce the bitterness and include its worthiness as a food material. Based on preliminary studies, the optimum practice to remove the bitterness was dipping 3 mm size diced banana blossom in 0.3% citric acid for 15 hours at 50°C, which considerably reduced bitterness without affecting nutritional integrity. Citric acid treated (CAT) Cavendish banana blossom dice were ground to make flour and investigated as a functional food component in producing spicy masala flavoured biscuits; four preparations of biscuits were made using 0%, 10%, 30%, and 50% CAT Cavendish banana blossom flour (CBBF). Nutritional analysis revealed when increasing the amount of CAT CBBF, fiber level in biscuit increased from 18.15 – 61.1, and ash from 5.9 – 6.35. It also decreased the level of protein from 31.15 – 18.8, fat from 15.5 – 12.2, total carbohydrates from 89.6 – 63.2, and moisture from 5.65 – 2.65, revealing its potential for a satisfactory shelf life. Though CAT CBBF enrichment added fiber to the diet, sensory properties were negatively influenced. According to the sensory analysis with 40 panelists, 10% and 30% levels of substitution were selected as optimum and therefore it can be recommended for commercialization. Packaging trial revealed that laminated aluminum pouch maintained the shelf life of biscuits for two months, while polypropylene (PP) and polyethylene terephthalate (PET) packets provided shorter shelf lives. This study brings into focus the possibility of utilizing tons of wasted banana blossoms in the circular economy by producing nutritious foods. In addition to proposing a waste minimization approach to Cavendish banana blossom, this study offers a novel approach towards production of healthier, higher-fiber spicy masala biscuits.

Keywords: *Cavendish banana blossom, Musa acuminata, Mitigating bitterness, Spicy masala biscuit*

Development of a fictional beverage from coffee pericarp and roasted coffee blends of *Coffea arabica*

P. Abijah¹, H. A. P. W. Hettiarachchi²

¹*Department of Agro-Technology, University of Colombo Institute for Agro-Technology and Rural Sciences, Hambantota, Sri Lanka*

²*Department of Bio System Technology, Faculty of Technology, Southeastern University, Sri Lanka*

During de-pulping, coffee pulp is produced as a byproduct. Although the coffee pulp is rich in bioactive compounds with good antioxidant properties, it is usually disposed of as waste without considering the health benefits. Therefore, efforts have been made to prepare a ready to serve extract (tea) from *Coffea arabica* to evaluate the antioxidant activity, flavonoid content and pH. The beverage was prepared at three fermentation times: 12 hours, 18 hours and 24 hours, by combining pulp and seed powder in 04 proportions as: 5 g + 0 g, 4.5 g + 0.5 g, 4.0 g + 1 g and 3.5 g + 1.5 g. These 12 treatments were replicated 4 times in a Completely Randomized Design (CRD) and were analysed as a two factor factorial. Each treatment combination was dissolved in 200 ml water and boiled on a hot plate. The prepared beverages were used to evaluate antioxidant activity, flavonoid content and pH. Results revealed that the antioxidant activity increased up to 18 h fermentation time and then decreased during 24 h fermentation. However, the pH decreased initially, and increased in 24 h fermentation. The decrease in antioxidant activity may be caused by a decrease in pH since the solution recorded higher acidity. Acidic pH values can cause phenolic compounds to become more stable; the protons can bind to DPPH thereby decreasing the antioxidant activity of the beverage. The decrease in pH value after fermentation may be due to the organic acids produced. In long fermentation the acetic acid formed would be used to stimulate the growth of yeast which could metabolize and produce alcohol and increase the pH.

Keywords: *Antioxidant, Coffea arabica, Coffee waste, pH, Pericarp*

Quality and sensory evaluation of different aromatic rice varieties for rice milkshake production

L. P. R. V. Piyumali¹, M. H. U. Siriwardana², J. A. N. Gimhani¹

¹*Department of Food Technology, University of Colombo, Institute for Agro-Technology and Rural Sciences, Hambanthota, Sri Lanka*

²*Rice Research Station, Ambalanthota, Sri Lanka*

This study focuses on the production of a gluten-free, non-dairy milkshake using three aromatic white rice varieties AT 306, AT 309, and BG 300. In this study, carried out at Rice Research Station, Ambalanthota, the products were evaluated based on sensory attributes, nutritional content, and shelf life. The milkshake was made using 85.2 g rice powder, 203.4 g sugar, 0.5 g salt, and 2 ml vanilla in one liter of water. Sensory analysis identified AT 306 as the most acceptable variety from appearance, aroma, and overall acceptability points of view. This suggests that the unique characteristics of this rice variety contributed to an enhanced sensory profile compared to the other varieties, AT 309 and BG 300, both of which were moderately accepted. The experiment was conducted using a Randomized Complete Block design. The protein content in the formulated milkshake was negligible, and thus, fortification can be necessary to improve its nutritional status. AT 306 showed antioxidant activity of 2.361%, amylose content of 0.49%, and minimal iron (0.000387%) and ash (0.000289%). Shelf-life studies revealed that the milkshake was stable for a period of up to 12 days under refrigerated (10°C) conditions but only 2 days at ambient room temperature. The findings show that AT 306 is the most suitable variety for rice milkshake production and holds promising sensory and shelf-life characteristics when stored refrigerated.

Keywords: *Nutrition, Rice milkshake, Sensory evaluation*

Quantification of caffeine and 5-Caffeoylquinic Acid (5CQA) in seven European commercial roasted coffees (*Coffea arabica*) using HPLC-PDA

U. R. Chandimala^{1,2}, Z. Ajtony¹

¹*Department of Food Science, Széchenyi István University, Mosonmagyaróvár, Hungary*

²*Department of Food Technology, Institute for Agro-Technology and Rural Sciences, University of Colombo, Hambantota, Sri Lanka*

Coffee is the second most consumed beverage in the world. Coffee infusions exert beneficial biological effects in the human body, generating significant health benefits attributed to caffeine and other phenolic compounds. This study was conducted to quantify caffeine and 5-Caffeoylquinic Acid (5CQA) concentrations in seven different types of commercially available roasted coffee with varying intensities: 1. Ristretto Espresso, 2. Viola Espresso, 3. Classico Espresso, 4. Espresso Intense, 5. Forte Lungo, 6. Milano Dolce Gusto, and 7. Decaffeinated Espresso, which are popular in Europe and globally. To extract caffeine and 5CQA, three methods were utilized: (1) heat refluxing with 40 mL of 60% methanol followed by a 20-fold dilution, (2) hot water extraction (30 or 50 mL) using a coffee machine followed by a dilution to 1000 mL, and (3) hot water extraction (300 mL) using a coffee machine followed by a dilution to 1000 mL. Caffeine and 5CQA were quantified using an HPLC-PDA system with an InertSustain Phenyl column, employing an isocratic procedure with 7% acetonitrile and 0.1% phosphoric acid as the mobile phase at wavelengths of 275 nm and 325 nm for caffeine and 5CQA, respectively. Methanolic extraction yielded higher concentrations of caffeine and 5CQA than the water extraction methods due to the increased solubility of the tested compounds in methanol. Based on method 3, which produced higher yields of caffeine and 5CQA, the highest concentration of 5CQA was found in the Forte Lungo espresso type (26.6 ± 0.6 mg/capsule), followed by the decaffeinated espresso (25.9 ± 0.5 mg/capsule). The highest caffeine concentration was found in Milano Dolce Gusto (109.3 ± 0.6 mg/capsule). The caffeine-to-5CQA ratios recorded in the tested coffee types were 4.69, 3.37, 2.29, 4.08, 2.09, 4.08, and 0.13. Based on these findings, we recommend that the most health-beneficial coffee sample tested in this study is the decaffeinated espresso.

Keywords: 5-CQA, Caffeine, Extraction, HPLC, Roasted coffee

TRACK: INNOVATIONS IN SUSTAINABLE LIVESTOCK, AQUACULTURE, AND HEALTH

Rice farmer's perception and knowledge on rice fish integration in some selected areas of Kurunegala District

R. M. S. U. Rajapaksha, H. K. R. S. Kumara

Department of Food Technology, University of Colombo Institute for Agro-Technology and Rural Sciences, Hambantota, Sri Lanka

Rice-fish integration is a sustainable agriculture practice that involves the simultaneous cultivation of rice and fish in the same field. However, the success of rice -fish integration depends on the knowledge and perception of farmers towards this practice. This study aimed to explore the perception and knowledge of rice farmers on rice-fish integration in selected areas of the Kurunegala District. A total of 200 potential rice farmers were selected using a third-stage sampling procedure. Data collection was facilitated through a pre-tested questionnaire, and subsequent analysis was conducted using descriptive statistics. The results revealed that the majority of rice farmers were older than 60 years, with the largest group being those aged 50 or older, and the majority (84%) of the respondents were male. Although there was a low knowledge of rice-fish integration among farmers, only 60% of farmers are willing to practice rice-fish farming, while 14% did not accept. On average, respondents had a positive perception of integrated rice-fish farming, with a (mean score of 3.73). The study identified, the presence of fish in the rice field boost rice field fertility and lower fertilizer needs (mean score 4.01), waste and by-product from one subsystem are used as input on the other subsystem (mean score 3.17) and weeding should not be done with the use of herbicides (mean score 3.84) as major reasons to consider knowledge of farmers for rice-fish farming. Furthermore, the respondent's age and paddy production level were found to positively impact their preferences for practicing rice-fish farming. The study concluded that the rice farmers had moderate knowledge and positive perception on integrated rice and fish farming. There is a need to provide necessary support, such as irrigation facilities, adequate training and resources to help them to adopt this sustainable agriculture practice in Kurunegala District. Additionally, rice-fish farming initiatives should be targeted towards potential rice farmers experiencing low production and young farmers.

Keywords: *Integrated rice-fish farming (IRFF), Kurunegala District, Perception and knowledge, Training and targeted initiatives*

Knowledge, perception and constraints of the food fish farmers and traders on Rice-Fish Integration in Kurunegala District

N. A. D. P. A. Samaranayaka, H. K. R. S. Kumara

Department of Food Technology, University of Colombo Institute for Agro-Technology and Rural Sciences, Hambantota, Sri Lanka

Rice-Fish Integration (RFI) is a sustainable farming system that can improve food security and farmer income. Despite its benefits, adoption in Sri Lanka remains low due to limited awareness, resources, and market access. This study explored the knowledge, perceptions, and challenges faced by farmers and traders to identify opportunities for promoting RFI in Kurunegala District. This study surveyed 52 registered food fish farmers and 81 traders in Kurunegala District using pre-tested questionnaires. Data were collected through a physical meeting and analyzed using descriptive statistics and Likert-scale analysis in SPSS. Participants were selected from official registries to represent key farming and trading divisions in the district. A survey of food fish farmers in Kurunegala revealed that the majority (34.6%) were aged 36–45 years, with 75% male and 88.5% married. Most (73.1%) had completed secondary education, and 57.7% had 1–5 years of fish farming experience. Farming was primarily a supplemental income (78.8%), with 50% operating medium-scale farms (0.5–2 acres). Tilapia was cultivated by 100% of farmers, marketed mainly through wholesale (57.7%). Knowledge of integrated rice-fish farming (IRFF) was moderate for 94.2% of farmers, with key awareness of species suitability (M.S.=3.76) and benefits like fertility enhancement (M.S.=3.34). Farmers held 100% positive perceptions towards IRFF, particularly recognizing water efficiency (M.S.=3.46) and waste recycling (M.S.=3.44). However, 55.8% were unwilling to adopt IRFF, citing critical constraints such as insufficient infrastructure (M.S.=4.0), lack of awareness (M.S.=3.92), and labour shortages (M.S.=3.78). Potential benefits identified included increased income (M.S.=3.90) and environmental benefits (M.S.=3.34). Among 81 fish traders, 77.8% had never heard of IRFF, and 82.7% were unfamiliar with rice-field fish products. While 51.9% were somewhat willing to include IRFF products in their business, concerns over supply, marketing, and awareness remain. These findings highlight the need for improved infrastructure, targeted education, and market development to enhance the adoption and sustainability of integrated rice-fish farming in Kurunegala District.

Keywords: *Constraints, Integrated farming, Knowledge, Perceptions, Rice-Fish Integration*

Diverse Pastures of Complementary Species (DPCS) to buffer dry summer conditions: A Review

R. Liyafudeen^{1,5}, I. F. López¹, L. Cranston¹, N. López-Villalobos¹, A. Cartmill¹,
B. A. Oliveira¹, I. P. Ordóñez², J. García-Favre³, J. Dörner⁴

¹*School of Agriculture and Environment, Massey University, New Zealand*

²*INIA Agricultural Research Institute, Chile*

³*Universidad de la República, Uruguay*

⁴*Universidad Austral de Chile, Chile*

⁵*Department of Agro-technology, University of Colombo Institute for Agro-technology and Rural Sciences, Hambantota, Sri Lanka*

Climate change, through altered rainfall and temperature patterns, affects global pastoral agricultural systems by exacerbating environmental stresses such as extreme temperatures and rainfall deficit or surplus, thereby constraining agricultural productivity and farm profitability. Pastures are increasingly exposed to extreme climate events, highlighting the need for adaptive strategies in pastoral systems to cope with evolving environmental challenges. In temperate humid climates, traditional pastures combining white clover (*Trifolium repens*, Tr) and perennial ryegrass (*Lolium perenne*, Lp), both shallow-rooted species, are losing persistence under these varying climatic conditions. This paper reviews the Diverse Pastures of Complementary Species (DPCS), which are climate-smart pastures that aid to cope and deal with growing water restriction periods in pastoral systems. According to recent studies, DPCS comprising these traditional shallow-rooted species, with the deep-rooted species — pasture brome (*Bromus valdivianus*, Bv) and cocksfoot (*Dactylis glomerata*, Dg) — express enhanced resource utilization, growth asynchrony and overyielding. Particularly in dry periods, DPCS exhibit significant production properties as the combination of hydraulic lift and pasture growth through the soil water restriction period. By managing species functional diversity, DPCS optimize soil water utilization, stabilize forage production, and increase pasture tolerance to climate change effects. However, DPCS implementation relies on species selection and management practices. The selection of complementary species with functional traits that enhance resource utilization is crucial for addressing specific environmental constraints and management conditions. This facilitates asynchronous growth and overyielding, where different species reach their peak growth at different times, a key ecological mechanism that promotes more stable pasture production throughout the year and reduces seasonal yield fluctuations. In addition, future studies should attempt to bridge the gap between theoretical understanding and practical application, especially concerning altered climatic conditions and economic sustainability.

Keywords: *Asynchronous growth, Climate change adaptation, Diverse Pastures Complementary Species (DPCS), Drought tolerance, Over-yielding*

Influence of fertilizer type and plant spacing on morphological characteristics and forage yield of *Brachiaria* hybrid Mulato II in the Dry Zone Sri Lanka

M. G. I. D. Munasingha, B. S. Bandusekara, J. G. N. D. Jayasinghe

Department of Agro-Technology, University of Colombo Institute for Agro-Technology and Rural Sciences, Hambantota, Sri Lanka

This experiment was conducted to evaluate the influence of fertilizer type and plant spacing on morphological characteristics and forage yield of *Brachiaria* hybrid mulato II in Hambantota District, Sri Lanka under irrigated conditions. The experimental design used was a 3×2 factorial layout in a randomized complete block design with three replications which had a total of 24 plots, each measuring 2×2 m². The experiment had a total of 6 treatments with a factorial combination of two levels of intra - row spacing/plant. Spacing between plants were 15 cm and 30 cm and fertilizer types were U625 (Control), commercial mixture (CM) CM1 and CM2. In all treatments, inter – row spacing was 50 cm. The spacing between the block and plots was 2 m and 1 m respectively. Morphological parameters such as plant height (PH), number of tillers per plant (NTPP), leaf to stem ratio (LSR) were evaluated. Data were subjected to GLM ANOVA (Analysis of Variance) following the procedures of SAS (Statistical Analysis System). The results showed that most of the morphological parameters were significantly ($p<0.05$) affected by fertilizer type and plant spacing. The tallest plants were observed under CM1 and CM2 (77.6 cm and 77.3 cm, respectively), compared to U625 (70.3 cm). Close spacing produced significantly greater plant height (77.7 cm) than wide spacing (72.5 cm). In contrast, wide spacing resulted in higher NTPP (25.1) compared to closespacing (21.1). Among fertilizer treatments, CM1 produced the highest tiller number (21.1), followed by CM2 (20.6) and U625 (16.0). LSR was significantly affected by both spacing and fertilizer, with the highest values recorded under CM1 (1.14) and at wider spacing (1.11). DMY was significantly influenced ($p<0.01$) by both fertilizer and plant spacing, with CM2 yielding the highest biomass (11.7 t/ha), while U625 recorded the lowest (9.6 t/ha). No significant differences were observed between CM1 and CM2 in terms of PH, LSR, NTPP, and DMY. These findings suggest that the use of low-cost commercial fertilizers (CM1 and CM2), particularly in combination with close spacing, can effectively enhance the yield potential of Mulato II grass, while wider spacing may favour individual plant development. This supports the viability of Mulato II as a productive forage option in the Dry Zone of Sri Lanka.

Keywords: *Brachiaria* hybrid, Plant height, Tillering, Forage yield, Fertilizer response

**Formulation of herbal dry shampoo powder using palmyrah
(*Borrassus flabellifer*) tender leaves**

S. Thilaksha¹, D. M. C. C. Gunathilake¹, A. Balasubramaniyam²

¹*Department of Food Technology, University of Colombo Institute for Agro-Technology and Rural Sciences, Hambantota, Sri Lanka*

²*Department of Food Science, Palmyrah Research Institute, Kaithady, Jaffna, Sri Lanka*

Natural hair care products are becoming more and more popular as people become more conscious of the negative consequences of artificial, synthetic hair care products. This research study concentrated to develop a herbal dry shampoo powder using the tender leaves of Palmyrah (*Borrassus flabellifer*) to treat dandruff. Palmyrah tender leaves are generally considered as a herbal medicine for treating bacterial and fungal growth. Palmyrah tender leaves, along with Shikakai, Soapberry, Fenugreek, and Hibiscus petals, were dried and powdered. These powders were then mixed in a 1:1:1:1:1 ratio. The mixture was further dried to 9.5% moisture content and tested for anti-fungal effects. The treatments used were T1 (control), T2, T3, T4, T5, and T6. The results showed that Treatment 2 (Palmyrah male inflorescence: 20 g, Red hibiscus petals: 20 g, *Acacia concinna*: 20 g, Soapberry: 20 g, Fenugreek: 20 g) exhibited higher dandruff inhibition than Treatment 3 (Palmyrah tender leaves: 20 g, Red hibiscus petals: 20 g, *Acacia concinna*: 20 g, Soapberry: 20 g, Fenugreek: 20 g). However, T2 had higher yeast and mold levels, making it unsuitable. There was no significant difference in inhibition between T2 and T3 ($p>0.05$), but the high yeast and mold in T2 led to its rejection. Treatment 3, containing palmyrah tender leaves, was selected as the best formulation for its antifungal properties and microbiological stability. It is the most effective treatment for controlling microbial growth in hair and can be used as a natural anti-dandruff shampoo powder.

Keywords: *Antimicrobial properties, Herbal dry shampoo, Palmyrah tender leaves, Sensory analysis, Shelf life*

NATIONAL INSTITUTE OF LIBRARY AND INFORMATION SCIENCES (NILIS)



*Innovative Libraries, Inclusive Communities:
Building Bridges Through Knowledge*

30th October 2025

MESSAGE FROM THE DIRECTOR/ SYMPOSIUM CHAIR

Professor Ruwan Gamage

*National Institute of Library and Information Sciences
University of Colombo
Sri Lanka*



It is with great pleasure that we present the NILIS Research Symposium (NRS) 2025 under the theme “Innovative Libraries, Inclusive Communities: Building Bridges Through Knowledge.” This aligns with the University of Colombo’s central theme, “Research for Resilience - Advancing Knowledge in a Changing World,” and reflects our shared commitment to inclusive and innovative knowledge creation.

This year, 32 research papers were received, and 20 have been selected for oral and poster presentations following a rigorous review process. In keeping with tradition, this publication includes an extract of abstracts contributed by NILIS academic staff, while the full proceedings will feature all national and international submissions.

I extend my sincere appreciation to our Chief Guest, Professor Indika Karunathilake, and to our keynote and invited speakers for their valuable contributions. My heartfelt thanks also go to the Editorial Committee for their exceptional work in reviewing and selecting the best studies, and to the Organizing, Program, IT, and Logistics Committees for their tireless dedication. I must convey my gratitude to the past Acting Director, who guided the team from the beginning.

The symposium, which will continue for three days following the inauguration, represents the collective effort of the entire NILIS community. I wish all participants productive discussions and a rewarding experience at NRS 2025.

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SYMPOSIUM PROGRAMME

8.30 am – 9.00 am	Participant Registration
9.00 am – 9.10 am	Lighting of the Oil Lamp
9.10 am – 9.15 am	Welcome Address <i>Acting Director, NILIS, University of Colombo</i>
9.15 am – 9.40 am	Keynote Address 1: “Is Digital Cultural Memory a Task for Libraries?” <i>Prof. Eric Steinhauer</i> <i>Director, University Library, Fern University in Hagen, Germany</i>
9.40 am – 10.00 am	Keynote Address 2: “Bridging Knowledge and Community: Innovation as a Driver of Inclusion” <i>Dr. Muditha Senerath Yapa</i> <i>Director General, National Initiative for R&D commercialization, Sri Lanka</i>
10.00 am – 10.15 am	Address by the Chief Guest <i>Prof. Indika Karunathilake</i> <i>Vice-Chancellor, University of Colombo, Sri Lanka</i>
10.15 am – 10.20 am	Vote of Thanks by the Symposium Co-Chair <i>Dr. S. Ketheeswaran</i>
10.20 am – 11.00 am	Tea Break and Poster Session
11.00 am – 12.15 pm	Technical Session 1: Libraries and the Knowledge Society, followed by Q&A
12.15 pm – 1.00 pm	Lunch Break
1.00 pm – 2.00 pm	Technical Session 2: Digital Transformation and Service Innovation, followed by Q&A
2.00 pm – 3.00 pm	Technical Session 3: Inclusion, Empowerment, and Community Engagement, followed by Q&A
3.00 pm – 3.30 pm	Closing ceremony and announcement of awards
3.45 pm	End of the symposium and Tea

INTRODUCTION TO THE KEYNOTE SPEAKER

Professor Dr. Jur. Eric W. Steinhauer

*Director
University Library
Fern University in Hagen
Germany*



Professor Steinhauer is a librarian and doctor of law, currently serving as Director of the University Library at FernUniversität in Hagen. The FernUniversität is a distance-learning institution with approximately 75,000 students, most of whom are supported through digital services. In addition, he is an honorary professor at the Institute for Library and Information Science at Humboldt University in Berlin and a permanent fellow at the Centre for Advanced Study "Access to Cultural Goods in Digital Change" at the University of Münster. His research interests lie particularly in preserving digital cultural memory in institutions such as libraries, archives, and museums, as well as legal and ethical practices in the context of digital transformation.

ABSTRACT OF THE KEYNOTE ADDRESS

Digital Cultural Memory: Are Libraries Ready to Take Up the Challenge?

Professor Dr. Jur. Eric W. Steinhauer

Director, University Library, Fern University in Hagen, Germany

The preservation of cultural memory has always been at the heart of libraries and archives. In the digital age, however, this mission takes on a new dimension. Increasingly, the traces of collective life are no longer physical books or manuscripts but “born digital” artifacts— websites, blogs, social media posts, digital artworks, databases, and other native digital forms. The question of how these materials can be collected, safeguarded, and preserved for the future has become a pressing issue, raising challenges that differ fundamentally from those in the analog world. This keynote will address the problem of digital cultural memory as a central task for libraries and archives. While technological issues such as formats, migration, and obsolescence form part of the background, the focus will lie on legal and curatorial challenges. Copyright restrictions, licensing regimes, platform rules, and data protection laws create a complex legal environment in which access to and retention of digital works is often more limited than in the analog sphere. At the same time, the abundance and volatility of digital content make comprehensive preservation impossible. Decisions about what to preserve therefore require new criteria, as cultural significance, representativeness, and long-term value take on different meanings in the context of rapidly changing digital communication. The keynote argues that digital cultural memory cannot be managed as a mere extension of analog collection policies. Instead, it calls for new legal frameworks, ethical guidelines, and a dynamic understanding of cultural heritage - one that reflects both the fragility and the vitality of the digital age.

LIST OF ABSTRACTS

The effectiveness of resource-based learning among Bachelor of Education students at the University of Colombo <i>R. P. P. Ranaweera, U. P. Alahakoon</i>	601
Compliance of Sri Lankan humanities and social sciences journals' author guidelines with the EASE checklist <i>K. K. N. L. Perera, C. J. Wijesundara</i>	602
Evaluating the national digitization project of the National Science Foundation Sri Lanka: Achievements, challenges, and library perspectives <i>N. A. H. Priyadarshani, R. C. G. Gamage</i>	603
Evaluating the use of scholarly databases by undergraduates at Sri Lanka Institute of Information Technology <i>R. A. D. J. Priyanka, R. P. P. Ranaweera</i>	604
Teachers' expectations and undergraduates' use of information resources in completing continuous assessments <i>P. A. A. H. Upathissa, R. C. G. Gamage</i>	605
Information-seeking behaviour of undergraduates: A case study at a private university library in Sri Lanka <i>M. P. M. K. De Silva, S. D. Somaratna</i>	606
Follow-up study on the impact of financial, mobile, and information literacy training for senior citizens in Sri Lanka <i>H. K. Diwyanjalee, R. C. G. Gamage, R. P. P. Ranaweera, V. Gangabadaarachchi</i>	607
Information-seeking behavior of dental professionals attached to Postgraduate Institute of Medicine, University of Colombo, Sri Lanka <i>A. H. T. H. R. Nikethani, D. Munasinghe</i>	608
Evaluating the utilization of electronic resources in postgraduate medical education: Awareness, usage and user satisfaction at the Postgraduate Institute of Medicine, University of Colombo, Sri Lanka <i>W. M. N. M. Wanigasekara, D. Munasinghe</i>	609

The effectiveness of resource-based learning among Bachelor of Education students at the University of Colombo

R. P. P. Ranaweera, U. P. Alahakoon

National Institute of Library and Information Sciences (NILIS), University of Colombo, Sri Lanka

Resource-Based Learning (RBL) is highlighted as an effective strategy for developing higher-order skills, moving beyond textbooks to include varied sources in their learning. Rooted in a shift from traditional teacher-centered methods to student-centered approaches, RBL utilizes diverse resources - printed, digital, audio-visual, and community-based - to promote active learning and independent knowledge construction. Resource persons from the National Institute of Library and Information Sciences taught the Library and Information Management module offered in the 4th year of the Bachelor of Education programme of the Faculty of Education, University of Colombo, during 2024/2025 applying RBL methods using the NILIS library, and other audio-visual resources. At the end of the programme, an assignment was given. Students were asked to write a reflective journal of their experience in learning the module. Using a qualitative design, this study analyzes all the journals (total of 95) submitted by Sinhala and English medium students of the programme. The content analysis revealed that 92% of students believed RBL would significantly benefit their future careers as teachers, while 85% demonstrated a practical understanding of the teacher's role as a facilitator. Additionally, 74% suggested introducing the module in the first year to enhance learning outcomes, and 80% reported a greater appreciation for the school library's role in teaching and learning. Students described the experience as enjoyable and transformative, largely due to its departure from traditional lecture-based formats. The findings highlight RBL's potential to foster self-directed learning, critical thinking, and the effective use of diverse educational resources. It is recommended that RBL be embedded in the first-year curriculum to strengthen the use of library resources and community-based learning opportunities in teacher education.

Keywords: *Resource-based learning, Student-centered learning, Teacher education, Higher education*

Compliance of Sri Lankan humanities and social sciences journals' author guidelines with the EASE checklist

K. K. N. L. Perera¹, C. J. Wijesundara²

¹*Medical Library, Faculty of Medicine, University of Colombo, Sri Lanka*

²*Main Library, University of Colombo, Sri Lanka*

Sri Lankan humanities and social sciences (HSS) journals often lack international visibility, highlighting the need to enhance their quality by aligning with international standards. This study aims to measure the criterion compliance of author guidelines of Sri Lankan journals in humanities and social sciences field with the European Association of Science Editors (EASE) framework. All Sri Lankan journals related to HSS stream, appearing in the Sri Lanka Journals Online (SLJOL) platform (n=74) were selected for the analysis. The criterion compliance was measured using quantitative content analysis approach. Thirty-six (36) criteria mentioned in EASE framework were used for the analysis. Both strengths and weaknesses in the author guidelines of Sri Lankan HSS journals were observed. The average criterion compliance was 42% (ranging from 100%: authors' affiliations to 5.4%: date of last update). Encouragingly, clear instructions on plagiarism policies (71.6%) and referencing styles (86.5%) showed a higher criterion compliance reflecting the concern on academic integrity. However, many journals showed a gap in data/artifact sharing guidance (33.8%), contributor roles (25.7%), and gender equity considerations (18.9%) which are areas increasingly prioritized by global editorial bodies. Considering the gaps identified through the study, it is suggested to develop further improved tailor-made guidelines, based on EASE framework to provide clear instructions for authors in the scholarly journals related to HSS field in Sri Lanka. It is also recommended to organize capacity building workshops for authors and editors in the HSS field to support the implementation of these improved guidelines. Maintaining a balance between international standards and local constraints should also be taken into consideration. The EASE framework which was last updated in 2021 does not mention AI transparency statements, yet it should also be considered when developing tailor-made author guidelines for Sri Lankan scholars in the HSS field.

Keywords: *Author guidelines, EASE checklist, HSS journals, Criterion compliance*

Evaluating the national digitization project of the National Science Foundation Sri Lanka: Achievements, challenges, and library perspectives

N. A. H. Priyadarshani^{1,2}, R. C. G. Gamage²

¹*National Science Foundation of Sri Lanka*

²*National Institute of Library and Information Sciences (NILIS), University of Colombo*

This study evaluates the National Digitization Project (NDP) of the National Science Foundation (NSF) of Sri Lanka, which was implemented from 2011 to 2018, using a survey administered in 2025, after 7 years of implementation. The objective of NDP was to enhance accessibility, visibility, and long-term preservation through the establishment of a nationwide network of institutional repositories. Twenty-five (25) university, research, statutory, and government libraries participated in the project. NSF supported digitization of 3 million pages of content from annual reports, journals, conference proceedings, theses and other publications selected by participating libraries. Main criteria for selection were institutional priority, scientific relevance and rarity. The heads of all 25 libraries were included in the questionnaire-based survey. Twenty-one (21) responded. The nature of support provided by NSF, current state, usage, and challenges faced by them were analyzed. To date, 17 (84%) repositories remain active. Among them, four (4) are at low to moderate usage. Participants acknowledged the NSF's significant role in providing technical support and training. They strongly agreed that the project encouraged establishing a digital culture and enabling collaboration among institutions. Persistent challenges were insufficient skilled staff (52%), limited ongoing training opportunities (42%), copyright concerns (38%), and lack of infrastructure (33%). To address these issues, the study recommends providing continuous training programmes, sustained technical support, as well as amending institutional repository policies, and executing targeted promotional campaigns. In conclusion, digitization should not be viewed as a one-time initiative but as a continuous and sustained process. These are essential to maximize the long-term impact of the NDP to ensure the sustainable digital preservation of Sri Lanka's scientific and technical literature.

Keywords: *National Digitization Project, Institutional repositories, Sustainability of projects*

Evaluating the use of scholarly databases by undergraduates at Sri Lanka Institute of Information Technology

R. A. D. J. Priyanka¹, R. P. P. Ranaweera²

¹*The Library, Sri Lanka Institute of Information Technology, Sri Lanka*

²*National Institute of Library and Information Sciences, University of Colombo, Sri Lanka*

Scholarly databases are a vital component of academic learning and research, offering access to peer-reviewed journals, e-books, and conference proceedings. The Sri Lanka Institute of Information Technology (SLIIT) invests significantly in subscribing to major scholarly databases such as IEEE Xplore, ScienceDirect, and Emerald Insight. However, it remains uncertain whether these resources are being effectively utilized by students. This study aimed to evaluate the use of scholarly databases by final year undergraduates in the Faculty of Computing at SLIIT. These students were chosen as they depend heavily on scholarly databases for coursework and final year research. The population of 300 students with active library memberships was identified through the Library Management System (LMS), and a sample of 169 was selected using Krejcie and Morgan's (1970) table and simple random sampling. Data were collected through a structured online questionnaire, with 130 valid responses received (76.9% response rate). The findings revealed that 31% of students used databases weekly, 25% used them rarely, and 18% had never used them. IEEE Xplore was the most frequently accessed database (76%). Scholarly databases were primarily used for final-year research (66%), assignments (62%), and group projects (53%). Key challenges included a lack of search skills (41%), reliance on free online resources (34%), and difficulty in evaluating sources (23%). To address these challenges, students proposed step-by-step guides (68%), short video tutorials (67%), and easier remote access (47%). The study concludes that although students recognize the value of scholarly databases, their effective use is limited by a lack of awareness and confidence. Addressing these issues through structured training, simplified access, and stronger promotion can improve student engagement and ensure that the university's investment in these resources more effectively supports teaching, learning, and research.

Keywords: *Scholarly databases, Information literacy, SLIIT library, Digital library, Private higher education*

Teachers' expectations and undergraduates' use of information resources in completing continuous assessments

P. A. A. H. Upathissa, R. C. G. Gamage

National Institute of Library and Information Sciences, University of Colombo, Sri Lanka

Continuous assessments (CAs) are a key component of undergraduate learning, requiring students to engage with diverse information resources. Previous studies have examined assignment types, resource usage, access methods, and challenges related to CAs. However, limited attention has been given to lecturers' expectations of information use and the gaps between these expectations and students' practices. This study addresses this gap by investigating how undergraduates at a private university (coded as ABC University) in Sri Lanka use information resources for assignments as a type of CAs, and how this aligns with what lecturers' value. The University provides undergraduate courses in three disciplines: Engineering, Computing, and Business. A mixed-method survey design was adopted with a non-probabilistic sample. The population comprised 1,410 undergraduates and 62 academic and academic support staff. A convenience sample of 100 students and 15 staff members responded to an online questionnaire. Six staff members were purposively selected for follow-up interviews for triangulation. In addition, reference lists of 29 assignment answers from all three disciplines underwent a bibliometric analysis. Across all faculties, lecturers confirmed the necessity of using formal academic sources such as journal articles, academic textbooks, and library databases in completing undergraduate assignments. However, findings revealed variations in sources used by students. Engineering students often relied on academically trusted sources such as e-journals, library databases, and textbooks, while Computing students depended heavily on web-based resources, AI tools, and code repositories. Business students demonstrated a mixed approach, incorporating e-books, AI tools, and practical resources. Across all disciplines, lecture notes, websites, and online tools are used frequently, with limited reliance on physical libraries or paid subscriptions. Key challenges reported by students included limited search skills, time constraints, difficulties in citing references and evaluating source credibility. The study highlights both alignment and gaps between student practices and lecturer expectations. Strengthening information literacy and targeted support is recommended.

Keywords: *Academic and academic support staff, Access to information sources, Assignments, Continuous assessments, Information resources*

Information-seeking behaviour of undergraduates: A case study at a private university library in Sri Lanka

M. P. M. K. De Silva¹, S. D. Somaratna²

¹*Informatics Institute of Technology*

²*Science Library, Faculty of Science, University of Colombo, Sri Lanka*

Understanding the information-seeking behaviour of undergraduates is essential in the contemporary higher education landscape. While studies on information-seeking behaviour in academic libraries in Sri Lanka have mostly focused on state university libraries, there is limited research on private university libraries, which rely more on digital resources and online scholarly databases. Consequently, this study explores the information-seeking behaviour of undergraduates at a private university in Sri Lanka. The target population comprised 406 students from the 2024 mid-year intake, and a sample of 196 was selected using the Krejcie and Morgan table. The study employed a survey method with a random sampling technique, and data were collected through questionnaires to examine demographics, library usage patterns, resource preferences, user satisfaction, and barriers faced when accessing library resources. The response rate was 67.35%, with 132 responses received. Results indicate that most library users are Computer Science undergraduates (67%). They visit the library frequently, with 89.5% regularly using library facilities. Additionally, all respondents (100%) access the library's digital resources daily. The most requested materials are research papers (53%) related to computer science, mainly for assignments. Students reported high satisfaction with the accessibility of library resources (73.6%). They also expressed satisfaction with staff support in accessing information. The main barriers to accessing online library resources were poor internet connectivity (84.2%) and the limited availability of subject-specific journals. The study recommends enhancing student experience by focusing on two key areas: expanding digital resources with 24/7 access and creating new learning spaces within the library, including reliable Wi-Fi facilities. These strategic interventions aim to better align library services with the current academic and research needs of students.

Keywords: *Private university libraries, Information-seeking behaviour, User preferences, User satisfaction, Digital resources*

Follow-up study on the impact of financial, mobile, and information literacy training for senior citizens in Sri Lanka

H. K. Diwyanjalee^{1,2}, R. C. G. Gamage², R. P. P. Ranaweera², V. Gangabadaarachchi³

¹*KIU University, Battaramulla, Sri Lanka*

²*National Institute of Library and Information Sciences (NILIS), University of Colombo, Sri Lanka*

³*Colombo Public Library, Sri Lanka*

This study presents findings from a one-month follow-up of a pilot training programme on financial, mobile, and information literacy conducted for senior citizens in Colombo, Sri Lanka. The training was conducted based on a draft curriculum developed through a literature review followed by expert interviews. It consisted of ten weekly sessions held at the Colombo Public Library (CPL) on Saturdays. Participants were members of the senior citizen group of the CPL, and other visitors of the library. The training was aimed at strengthening seniors' ability to engage in financial transactions using physical and digital tools and safe online practices. Although every senior citizen who participated in at least one session (27) was included in the post-training telephone interviews, only 16 (59.3%) responded. A predefined interview guide was used for data collection. The responses were pooled, as the focus was on refining the curriculum. A thematic analysis was conducted to capture patterns in experiences, behavioural changes, and suggestions, which were then documented to support further curriculum development. Participants had retained and reused key learnings, including the use of ChatGPT, online banking apps, the 'Helakuru' app, mobile settings, fraud awareness. Before the programme, participants had low confidence in mobile and financial tasks. Persistent challenges included online bill payments and anxiety over digital banking. Some had relied on family or colleagues for support, while others preferred independent management due to security concerns. After the training, they began experimenting with these tools, though many stated that they required further practice and guidance. Expectations had been largely met through the training, although one participant said the content was too advanced. Suggestions focused on extending the number of sessions and duration of each session allowing deeper practice. The study highlights both the potential and challenges of training older adults in digital financial literacy.

Keywords: *Senior citizens, Digital literacy, Digital inclusion*

Information-seeking behavior of dental professionals attached to Postgraduate Institute of Medicine, University of Colombo, Sri Lanka

A. H. T. H. R. Nikethani, D. Munasinghe

Postgraduate Institute of Medicine, University of Colombo, Sri Lanka

This study investigates the information-seeking behaviour (ISB) of dental professionals affiliated with the University of Colombo's Postgraduate Institute of Medicine (PGIM). Despite the availability of electronic resources at PGIM, limited awareness, inconsistent usage, and varying levels of user satisfaction have been observed. Understanding how dental professionals search for, acquire, and use information is critical as Evidence-Based Dentistry (EBD) becomes increasingly important in delivering high quality patient care and maintaining academic excellence. The study aims to analyse their key information sources, identify critical barriers to access such as time constraints and skill deficits and assess their digital literacy training needs. The ultimate objective is to formulate evidence-based recommendations for innovative library services and, institutional strategies that support evidence-based practice and foster an inclusive professional community. A total of 60 individuals, including academics, clinical practitioners, and postgraduate trainees, participated in a quantitative cross-sectional survey. Data were collected using a standardized questionnaire. The results showed that open online resources, particularly Google Scholar (75%) and PubMed (70%), were accessed more frequently than institutional resources such as the PGIM e-library (50%). Barriers to effective information seeking included inadequate time (60%), lack of search skills (50%), and insufficient infrastructural facilities (30%) when accessing resources remotely. The study highlights the necessity of systematic interventions, including digital literacy education, increased awareness of institutional resources, and policy changes to facilitate open-access platforms. The study recommends measures to improve access to resources in order to facilitate Sri Lanka's postgraduate dental education system.

Keywords: *Information-seeking behaviour, Digital literacy, Dental education, Postgraduate training, Evidence-based practice*

Evaluating the utilization of electronic resources in postgraduate medical education: Awareness, usage and user satisfaction at the Postgraduate Institute of Medicine, University of Colombo, Sri Lanka

W. M. N. M. Wanigasekara, D. Munasinghe

Library, Postgraduate Institute of Medicine, University of Colombo, Sri Lanka

This study evaluates the awareness, usage patterns, and user satisfaction regarding electronic resources (e-resources) among postgraduate (PG) trainees and PG trainers (teachers) at the Postgraduate Institute of Medicine (PGIM), University of Colombo, with the aim of enhancing their utilization in postgraduate medical education. The study focused on MD trainees and PG trainers who attended the PGIM library orientation programme. A structured questionnaire was administered to 56 participants, and data were analysed using descriptive statistical methods. Of the 56 respondents, 78.6% (n = 44) were MD trainees, while 21.4% (n = 12) were PG trainers. Most participants accessed e-resources from home (48.4%, n = 27), followed by hospital settings (28.6%, n = 16) and the PGIM library (23.0%, n = 13). Laptops were the primary device used (62.5%), while tablets (21.4%) and smartphones (16.1%) were also utilized for research and reference purposes. Key motivations for e-resource usage included renewing clinical knowledge (82.1%), supporting patient care (76.8%), diagnostic and treatment planning (71.4%), and educational research (64.3%). While 71.4% of participants expressed high satisfaction with the quality, accessibility, and relevance of PGIM's e-resources, 14.3% highlighted the need for regular orientation or refresher sessions to improve database navigation skills. The findings underscore the critical role of e-resources in postgraduate medical education while identifying gaps in training and access. The study recommends enhanced training programmes for PG trainees and trainers, along with infrastructural improvements to optimize the utilization of e-resources. Addressing these gaps can strengthen digital learning, evidence-based practice, and clinical competency in Sri Lankan medical education.

Keywords: *E-Resources, Postgraduate medical education, User awareness, User satisfaction*

INSTITUTE OF BIOCHEMISTRY, MOLECULAR BIOLOGY AND BIOTECHNOLOGY (IBMBB)



13th Annual Scientific Session

24th October 2025

MESSAGE FROM THE DIRECTOR

Professor Prasanna Galhena

*Professor in Biochemistry and Clinical Chemistry
Institute of Biochemistry, Molecular Biology and, Biotechnology
University of Colombo
Sri Lanka*



On behalf of the Institute of Biochemistry, Molecular Biology and, Biotechnology (IBMBB), University of Colombo, I would like to extend my warmest welcome to all the delegates and participants for the 13th Annual Scientific Session of the IBMBB, University of Colombo.

This is one of the key events at the IBMBB, that facilitates an interactive dialog among all the stakeholders in the field of Life Sciences. Annual Scientific Session 2025 primarily focuses on advancement in health sciences, biotechnology applications and developments in natural products, giving opportunities for the student community to interact with expertise in the field. Professor Stanley Wijesundera memorial lecture 2025, will be delivered by Prof. Dileep De Silva, Professor of Community Dentistry, Faculty of Dental Sciences, University of Peradeniya.

I would like to express my sincere gratitude to the distinguished invited speakers for their presence and contribution to this year session. I also thank all the resource people who have contributed in numerous ways to making the event a success.

Finally, I would like to express my appreciation to the team at IBMBB who worked tirelessly to bring you a productive session despite all the challenges encountered.

MESSAGE FROM THE CHAIRPERSON

Professor Nimal Punyasiri

*Professor and Chair of Biochemistry
Institute of Biochemistry, Molecular Biology and, Biotechnology
University of Colombo
Sri Lanka*



The Institute of Biochemistry, Molecular Biology and Biotechnology (IBMBB), University of Colombo, held its 13th Annual Scientific Session on 24th October 2025. The Chief Guest at the event was Professor Indika Mahesh Karunatillake, Vice-Chancellor, University of Colombo. The sessions were graced by distinguished invitees, including Deans and Directors of the University of Colombo, the Registrar, Bursar, and many other esteemed guests.

The Annual Scientific Sessions provide an important platform for disseminating the research findings of IBMBB students as well as scientists from other higher educational institutions. It is a matter of pride that these sessions have been conducted continuously since 2006, except in the years when the IBMBB hosted its International Conferences in 2009, 2014, and 2024.

A key highlight of the Annual Research Sessions is the Professor Stanley Wijesundera Memorial Lecture. This year, the lecture was delivered by Professor Dileep De Silva, Chair Professor and Board-Certified Specialist in Community Dentistry, Faculty of Dental Sciences, University of Peradeniya, and an eminent authority in Health Finance and Health Management. The 2025 Annual Scientific Sessions featured a total of 25 presentations, comprising 16 oral presentations and 9 poster presentations.

I take this opportunity to extend my sincere thanks to Professor Indika Mahesh Karunatillake, Vice-Chancellor of the University of Colombo, for gracing the occasion as Chief Guest, and to Professor Dileep De Silva for delivering the memorial lecture. I also wish to express my heartfelt gratitude to all those who contributed to the successful organization of this event.

ORGANIZING COMMITTEE

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Coordinator (IT and Publicity)	Dr. K. S. Senanayake

SYMPOSIUM PROGRAMME

8.30 am – 9.00 am	Registration
9.00 am – 9.05 am	Inauguration
9.05 am – 9.10 am	Lighting of the Traditional Oil Lamp
9.10 am – 9.20 am	Welcome Address by Director IBMBB
9.20 am – 9.30 am	Address by Vice-Chancellor, University of Colombo
9.30 am – 9.40 am	Best Teacher Award 2023/2024 & Research Excellence Award 2023/2024
9.40 am – 10.30 am	Professor Stanley Wijesundera Memorial Lecture “Brains, Budgets, and Beds: Aligning Health HR, Finance, and Education for a Healthier Sri Lanka” <i>Prof. Dileep De Silva</i>
10.30 am – 10.40 am	Address by a Member of Prof. Wijesundera family
10.40 am – 10.45 am	Vote of Thanks
10.45 am – 11.30 am	Tea
11.30 am – 13.15 pm	Oral Presentations; Session 1 (Medicinal Plants)
13.15 pm – 14.00 pm	Break
14.00 pm – 15.15 pm	Oral Presentations; Session 2 (Health Sciences)
14.15 pm – 16.15 pm	Poster Presentation
15.15 pm – 16.15 pm	Oral Presentations; Session 3 (Biotechnology)
16.30 pm – 16.45 pm	Tea
16.45 pm – 17.00 pm	Award Ceremony & Closing Remarks

INTRODUCTION TO THE ORATOR

Professor Dileep De Silva

*Chair Professor and Board-Certified Specialist in Community Dentistry
Faculty of Dental Sciences, University of Peradeniya
Sri Lanka*



Professor Dileep De Silva, Chair Professor of Community Dentistry at the Faculty of Dental Sciences, University of Peradeniya. A distinguished scholar and practitioner, Professor De Silva completed his entire schooling at S. Thomas' College, Mount Lavinia, where he excelled as a senior prefect and captained both the athletics and debating teams.

He is a uniquely multi-qualified professional, holding credentials as a Dental Surgeon, Board-Certified Specialist in Dental Public Health, Health Finance Specialist, Cost and Management Accountant, and Chartered Banker. His academic achievements include a BDS from the University of Peradeniya, MSc and MD in Community Dentistry from the Postgraduate Institute of Medicine, University of Colombo, an MBA from the University of Colombo, and a PhD in Health Management from the University of Southampton, UK. He is also a Fellow in Dental Surgery of the Royal College of Physicians and Surgeons of Glasgow.

Professor De Silva's career spans over 25 years in the Ministry of Health, where he led initiatives in Health Human Resources and Health Economics, including the landmark publication of Sri Lanka's first National Health Account. He has served as a consultant for WHO, the World Bank, and ADB, contributing his expertise in Health Finance and HR.

In academia, Professor De Silva has been a lecturer, trainer, and examiner at the Postgraduate Institute of Medicine since 2010, while currently serving as Director of the Career Guidance Unit of the University of Peradeniya and chairing the Faculty of Dental Sciences' Higher Degree and Postgraduate Committee. He has also held leadership roles including Past President of the Sri Lanka Dental Association and membership on multiple Boards of Study and the Board of Management at PGIM.

A prolific author, Professor De Silva has written two books, nine chapters, and over 60 peer-reviewed publications. His outstanding contributions have been recognized with numerous national and international awards, including the National Apex Award in the Health Sector, the Best Young Professional Award from the Commonwealth, and accolades from Asia Pacific Action Alliance on Human Resources for Health. He has delivered over 170 guest lectures globally and presented nine prestigious orations, affirming his stature as a leader in health, dentistry, and academia.

PROFESSOR STANLEY WIJESUNDERA MEMORIAL LECTURE

Brains, Budgets and Beds: Aligning Health HR, Finance and Education for a Healthier Sri Lanka

Professor Dileep De Silva

Faculty of Dental Sciences, University of Peradeniya, Sri Lanka

This memorial lecture, delivered in honour of the late Professor Stanley Wijesundera—the inaugural Vice-Chancellor of the University of Colombo and a distinguished academic and administrator—critically examines the structural and financial dimensions of Sri Lanka’s allopathic health system, with particular emphasis on human resource development. The lecture presents an analytical overview of both the public and private healthcare sectors, delineating their respective contributions to service delivery and health outcomes. Special focus is placed on the public health sector, which remains central to ensuring equitable and universal access to healthcare services.

A detailed evaluation of national health expenditure is undertaken, including an assessment of health spending as a proportion of Gross Domestic Product (GDP). The principal sources of health sector financing—namely government budgetary allocations, out-of-pocket household expenditures, and external donor contributions—are identified and examined. The distribution of funds between recurrent and capital expenditure is analysed, with reference to its implications for service efficiency, system sustainability, and infrastructure development.

The lecture further addresses the training and deployment of the health workforce, with primary focus on the medical, nursing, and allied health professions. It assesses current capacities in undergraduate and postgraduate education, curricular trends, and the institutional frameworks governing health professional training. Issues related to employability, workforce retention, and international migration are also explored within the context of prevailing fiscal and infrastructural constraints.

In commemorating Professor Wijesundara’s enduring legacy in higher education and public service, this lecture aims to foster a critical discourse on the trajectory of Sri Lanka’s health system. It seeks to identify strategic priorities for reform, with a view to enhancing the efficiency, equity, and quality of healthcare delivery in the country.

LIST OF ABSTRACT

Anti-glycemic activity of ethanolic extract and essential oils obtained by solvent-free microwave extraction and hydro-distillation of rhizomes and leaves of <i>Alpinia calcarata</i> Roscoe	
<i>N. M. T. Aazif, J. K. R. R. Samarasekera, G. D. Liyanaarachchi, N. Fernando</i>	622
Diagnostic value of BAT-25 and BAT-26 qPCR markers for microsatellite instability in colon cancer	
<i>H. D. L. Yadeeshani, V. Abeysuriya, U. Rajagopalan, V. Abeysuriya, F. N. Akram</i>	623
A preliminary study targeting exon 12 <i>MSH2</i> mutations in FFPE rectal tumors: feasibility and challenges	
<i>M. A. F. Nufla, H. D. L. Yadeeshani, V. Abeysuriya, S. De Silva, V. Abeysuriya</i>	624
Identification of genetic variants of <i>PHEX</i> gene in a cohort of children with hereditary hypophosphatemic rickets in Sri Lanka	
<i>M. M. Milhan, A. S. Hewage, S. De Silva, N. Atapattu</i>	625
Synergistic anticancer potential of <i>Andrographis paniculata</i> and <i>Datura metel</i> combined with Doxorubicin in inhibiting breast cancer cells	
<i>A. Kanagasundaram, U. Rajagopalan</i>	626
Anti-cancer potential of a supercritical CO₂ extract of Vernolac nutraceutical, a viable polyherbal formulation	
<i>P. C. Rathnayake, S. R. Samarakoon, K. S. Senathilake</i>	627
DC3B, a diterpene obtained from <i>Caesalpinia pulcherrima</i> modulates stemness in NTERA-2 cancer stem-like cells	
<i>D. M. D. C. Senavirathna, K. S. Senathilake, S. R. Samarakoon</i>	628
Extraction, characterization and optimization of marine algal-derived hydrogels for three-dimensional biomaterials	
<i>T. M. D. Darshanamala, U. Rajagopalan</i>	629
Detection of serum levels of human telomerase reverse transcriptase (<i>hTERT</i>) mRNA in non-alcoholic steatohepatitis (NASH) related hepatocellular carcinoma (HCC) in Sri Lanka	
<i>U. L. Umar, A. S. Hewage, S. De Silva, S. Samarasinghe, K. H. Tennekoon, R. C. Siriwardana, M. A. Niriella</i>	630
Isolation of nitrogen fixing and phosphate solubilizing bacteria from diverse soil ecosystems	
<i>M. Prabakaran, L. N. R. Gunaratna, O. V. D. S. J. Weerasena, P. Premanandarajah</i>	631
Comparison of protein profiles of medically important vipers in Sri Lanka	
<i>R. M. T. N. Perera, Y. B. N. S. De Kostha, C. A. Gnanathan, P. N. Weeratunga</i>	632

Inhibition of the production of reactive oxygen and reactive nitrogen species in RAW 264.7 cells by aqueous extract of <i>Artocarpus heterophyllus</i>	
<i>W. G. M. C. H. Perera, B. A. D. Rukshala, N. N. Vijithsingh, S. M. Handunnetti</i>	633
The <i>in vitro</i> effect of <i>Andrographis paniculata</i> on the viability and morphological changes induced by Vascular Endothelial Growth Factor on endothelial cells	
<i>J. K. Rodrigo, D. Jagoda, N. N. Vijithsingh, U. S. Wanigarathna</i>	634
Comparative analysis of flavonoid composition and expression of flavonoid biosynthesis enzymes in <i>Clitoria ternatea</i> varieties	
<i>S. Shanmugaprabha, P. A. N. Punyasiri, O. V. D. S. J. Weerasena, L. N. R. Gunaratne</i>	635
<i>In vivo</i> pharmacokinetic and tissue distribution studies of a natural anticancer diterpene isolated from <i>Caesalpinia pulcherrima</i>	
<i>S. D. V. Gunawardane, E. A. Oshadi, P. K. S. Wijerathne, P. A. N. Punyasiri, K. S. Senathilake, U. Rajagopalan, S. R. Samarakoon</i>	636
Development of a colorimetric RT-LAMP assay with novel primers for detection of Dengue virus in <i>Aedes aegypti</i> mosquitoes	
<i>M. D. S. Janaki, I. Sanchez-Vargas, O. C. Ratnayake, S. Elmegerhi, O. V. D. S. J. Weerasena, V. S. Aryaprema, N. Fernando, S. M. Handunnetti, P. P. S. L. Pathirana, H. A. Tissera, J. Rovnak, R. Perera</i>	637
QSAR-driven discovery of novel anticancer derivatives from a natural halogenated scaffold	
<i>R. M. R. K. Rathnayaka, K. H. Tennekoon, D. S. Gunasekara</i>	638
Preliminary genetic analysis of selected PYGL variants in two children with Glycogen Storage Disease Type VI in Sri Lanka	
<i>S. Nadaraja, S. De Silva, S. Hewage, N. Punyasiri, E. Jasinge, D. Warawita</i>	639
Isolation and molecular identification of lipase producing bacteria in natural oil substrates	
<i>A. M. P. Wickramaratna, O. V. D. S. J. Weerasena, L. N. R. Gunaratna</i>	640
Anti-inflammatory, antibacterial activity and chemical composition of essential oil extracted from <i>Citrus aurantium</i> L. leaves using solvent-free microwave extraction technique	
<i>D. Jagoda, G. D. Liyanaarachchi, N. Fernando, S. M. Handunnetti, H. D. Weeratunge, W. Divisekera, J. K. R. R. Samarasekera</i>	641
Comparison of diagnosis of Leptospirosis by microscopic agglutination test and polymerase chain reaction	
<i>P. D. Gangani, Y. de Silva, N. Fernando, S. Rajapakse, S. Premawansa, S. M. Handunnetti</i>	642

Therapeutic potential of a nutraceutical formula (Vernolac) in cancer therapy through integrated network pharmacology and computational simulations approach

S. D. V. Gunawardane, M. M. Milhan, P. C. Rathnayaka, P. S. Gurusinghe, K. S. Gunaratne, A. Kanagasundaram, T. M. D. Darshanamala, D. C. Senevirathne, K. S. Senathilake, S. R. Samarakoon 643

Synergistic effects of triple combination therapy with thymoquinone, *Datura metel* and *Andrographis paniculata* extracts on the proliferation of human lung cancer cells

M. M. Milhan 644

Anti-glycemic activity of ethanolic extract and essential oils obtained by solvent-free microwave extraction and hydro-distillation of rhizomes and leaves of *Alpinia calcarata* Roscoe

N. M. T. Aazif^{1,2}, J. K. R. R. Samarasekera², G. D. Liyanaarachchi², N. Fernando¹

¹*Institute of Biochemistry, Molecular Biology and Biotechnology, University of Colombo, Sri Lanka*

²*The Herbal Technology Section, Industrial Technology Institute, Colombo 07, Sri Lanka*

Alpinia calcarata Roscoe is a rhizomatous herb used in Ayurveda and traditional Sri Lankan indigenous medicine for treatment of metabolic disorders, including diabetes. Although its anti-diabetic properties have been preliminarily investigated, comprehensive studies evaluating the glycemic regulatory properties of both rhizomes and leaves have not been reported. This study evaluated the anti-glycemic activity of rhizomes and leaves of *A. calcarata* ethanolic extracts (EE) and essential oils (EOs) obtained by hydro-distillation (HD), and Solvent-Free Microwave Extraction (SFME). HD was performed with a Clevenger apparatus, while SFME used a NEOS GR microwave extractor to obtain EOs. EEs of rhizomes and leaves were obtained following standard protocols. Anti-glycemic activity of EOs and EEs were assessed through α -glucosidase and α -amylase inhibition, and an advanced glycation end-product (AGE) formation assay with acarbose as the positive control. The leaf EE exhibited the highest α -glucosidase inhibitory activity ($IC_{50} = 7.05 \pm 0.37 \mu\text{g/mL}$), followed by the rhizome EE ($IC_{50} = 23.79 \pm 0.56 \mu\text{g/mL}$) and both were more active than the standard drug acarbose ($IC_{50} = 430.55 \pm 0.14 \mu\text{g/mL}$). α -amylase inhibitory activity of the rhizome EE was notably higher ($IC_{50} = 5.70 \pm 0.09 \mu\text{g/mL}$) compared to acarbose ($IC_{50} = 76.28 \pm 0.25 \mu\text{g/mL}$). In contrast, the EOs extracted by HD and SFME showed weak inhibition in both enzyme assays, with inhibition values below 10% at 500 $\mu\text{g/mL}$. However, in the anti-AGE formation assay, EOs from leaf HD (13.08 mg RE/g) and leaf SFME (10.17 mg RE/g) showed higher inhibition compared to leaf EE (4.5 mg RE/g) and rhizome EE (3.42 mg RE/g). The EEs of *A. calcarata* rhizomes and leaves are rich in bioactive compounds and indicate strong anti-hyperglycemic effects. Additionally, the moderate anti-AGE activity observed in the EOs may further enhance therapeutic potential of this plant. Overall, these results highlight *A. calcarata* as a promising candidate for studies to identify phytochemicals, isolation and characterization of bioactive constituents and *in vivo* studies for development of natural anti-diabetic formulations.

Keywords: *Alpinia calcarata*, Antiglycemic, Inhibition, Essential oils, Ethanolic extracts

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Diagnostic value of BAT-25 and BAT-26 qPCR markers for microsatellite instability in colon cancer

H. D. L. Yadeeshani¹, V. Abeysuriya¹, U. Rajagopalan¹, V. Abeysuriya², F. N. Akram¹

¹*Institute of Biochemistry, Molecular Biology and Biotechnology, University of Colombo, Sri Lanka*

²*Faculty of Medicine, University of Kelaniya, Sri Lanka*

Colon cancer is a leading cause of cancer-related morbidity and mortality worldwide. Microsatellite instability (MSI), reflecting deficient DNA mismatch repair, is present in a subset of colon cancers and may serve as a useful diagnostic marker. This study aimed to detect MSI in colon cancer patients by analyzing BAT-25 and BAT-26 microsatellite markers using quantitative PCR (qPCR) in a Sri Lankan cohort. In a cross-sectional design, DNA was extracted from formalin-fixed paraffin-embedded (FFPE) tissues of ten patients who were confirmed as colon cancer patients by histopathological investigations. Five patients whose biopsy samples were confirmed negative for colon cancers, colon or rectal polyps were selected as controls. Comorbidities which effect the MSI status were not reported in the cohort. qPCR was performed to determine cycle threshold (Ct) values for BAT-25 and BAT-26. Group comparisons used t-tests, Mann-Whitney U, and ANOVA as appropriate. Logistic regression assessed the diagnostic potential of Ct values. ROC analysis determined the discriminatory performance of BAT-25 and BAT-26. Both BAT-25 and BAT-26 showed significantly different Ct values between patients and controls ($p < 0.05$). Lower (more negative) BAT-25 and BAT-26 values were associated with earlier T, N, and M stages. Logistic regression identified BAT-25 as a significant predictor of patient status ($p = 0.041$, OR = 0.82, 95% CI: 0.50–0.94). ROC analysis showed good discriminatory power for both markers, with area under the curve (AUC) values of 0.72 (BAT-25) and 0.80 (BAT-26), and specificity up to 80% in BAT 25 and 100% for BAT-26. qPCR-based analysis of BAT-25 and BAT-26 effectively distinguishes colon cancer patients from controls and correlating with disease stage. These findings support the utility of BAT-25 and BAT-26 as molecular markers for MSI detection in colon cancer, with potential diagnostic applications in clinical practice.

Keywords: *Colon cancer, Microsatellite instability, BAT-25, BAT-26, qPCR*

A preliminary study targeting exon 12 *MSH2* mutations in FFPE rectal tumors: feasibility and challenges

M. A. F. Nufla¹, H. D. L. Yadeeshani¹, V. Abeysuriya¹, S. De Silva¹, V. Abeysuriya²

¹*Institute of Biochemistry, Molecular Biology and Biotechnology, University of Colombo, Sri Lanka*

²*Faculty of Medicine, University of Kelaniya, Sri Lanka*

Rectal cancer constitutes a major burden of colorectal malignancies in Sri Lanka. Despite growing disease burden, Sri Lanka lacks molecular data and genomic profiles, particularly on Mismatch repair (MMR) gene mutations. *MSH2* is a frequently mutated MMR gene, associated with microsatellite instability-high (MSI-H) tumors. This pilot study explores the feasibility and limitations of detecting *MSH2* exon 12 mutations using formalin-fixed paraffin-embedded (FFPE) tissue the most accessible archival resource in local clinical settings. Twelve FFPE tumor samples and four control blocks were sectioned and processed using the QIAamp DNA FFPE Tissue Kit. DNA was quantified via NanoDrop spectrophotometry and agarose gel electrophoresis. Primers targeting exon 12 (471 bp) were designed using Primer-BLAST, BioEdit, and IDT OligoAnalyzer. PCR optimization was initially conducted with high-quality blood-derived DNA, then adapted for FFPE DNA using incremental changes in annealing temperature, MgCl₂ concentration (2.0-3.5 mM), and template pre-treatment (dilution, 95 °C incubation). Amplified products were visualized, gel-purified using low-melting agarose, and sequenced via Sanger method. Blood DNA consistently yielded specific 471 bp products. In contrast, FFPE DNA yielded smeared products or weak bands, often accompanied by primer-dimers. Gel-purified products from FFPE samples were successfully extracted but sequencing chromatograms showed poor peak resolution, baseline noise, and unreadable sequences, confirming insufficient template quality for Sanger sequencing. Amplification and sequencing of *MSH2* exon 12 from FFPE rectal tumor DNA proved technically unviable due to extensive fragmentation and chemical modifications inherent to formalin fixation. Large-amplicon PCR from FFPE was not consistently achievable despite multi-parameter optimization, indicating that prolonged/formalin fixation and block age are dominant constraints on amplifiability in this setting. Future efforts should employ standardizing fixation, enforcing block-age thresholds shorter amplicon designs, FFPE-specific polymerases, and enzymatic repair steps to enable reliable mutation detection from archival tissue. By systematically confronting the technical barriers of FFPE tissue genomics in a Sri Lankan context, this pioneering study not only highlights the urgent need for protocol innovation but also lays the foundation for accessible, population-scale molecular diagnostics in underrepresented cancer cohorts.

Keywords: Rectal cancer, *MSH2* exon 12, FFPE, DNA fragmentation, Optimization

Identification of genetic variants of *PHEX* gene in a cohort of children with hereditary hypophosphatemic rickets in Sri Lanka

M. M. Milhan¹, A. S. Hewage¹, S. De Silva¹, N. Atapattu²

¹*Institute of Biochemistry, Molecular Biology and Biotechnology, University of Colombo, Sri Lanka*

²*Lady Ridgway Hospital for Children, Colombo, Sri Lanka*

Hereditary hypophosphatemic rickets (HHR) comprises a group of rare genetic disorders characterized by renal phosphate wasting leading to chronic hypophosphatemic rickets. The most common form, X-linked hypophosphatemic rickets (XLHR), arises from inactivating mutations in the phosphate-regulating endopeptidase homolog X-linked (*PHEX*) gene, which disrupts phosphate homeostasis through dysregulation of the phosphaturic hormone FGF23. Although more than 800 pathogenic *PHEX* variants have been reported globally, the genetic variants in Sri Lankan patients remain unexplored. This study aimed to identify the genetic variants of XLHR in Sri Lankan pediatric patients. Eleven children clinically diagnosed with hypophosphatemic rickets underwent comprehensive evaluation, including biochemical analyses, radiological assessments, and phenotypic characterization. PCR amplification followed by targeted Sanger sequencing was performed on *PHEX* exons 17, 19, and 22, along with flanking intronic regions. Pathogenicity predictions were conducted using MutationTaster and SpliceAI algorithms. The index patient (Male) harboring a novel variant was diagnosed at one year and five months of age and exhibited hypophosphatemia (0.9 mmol/L, approximately 25% below the normal lower limit for age), markedly elevated alkaline phosphatase (682 U/L, nearly twofold above normal range), serum calcium within normal limits (2.31 mmol/L), and elevated parathyroid hormone (8.06 pmol/L). Radiographs revealed classic rickets features. Genetic analysis identified a novel intronic deletion variant, c.1900-31_1900-30del, within the polypyrimidine tract 30 base pairs upstream of exon 19. This two-nucleotide deletion reduces a consecutive thymine stretch from 12 to 10 bases, potentially disrupting splice acceptor site recognition and pre-mRNA splicing. MutationTaster predicted the variant as disease-causing with possible cryptic splice site generation, while SpliceAI assigned low pathogenicity scores, illustrating the complexity of non-coding variant interpretation. This is the first report of an intronic polypyrimidine tract deletion in the *PHEX* gene in Sri Lankan patients. The variant's associated clinical phenotype supports its pathogenicity. Functional validation studies are needed to confirm these findings.

Keywords: *X-linked hypophosphatemic rickets, PHEX gene, Polypyrimidine tract, Splice site, Hypophosphatemia*

Synergistic anticancer potential of *Andrographis paniculata* and *Datura metel* combined with Doxorubicin in inhibiting breast cancer cells

A. Kanagasundaram, U. Rajagopalan

Institute of Biochemistry, Molecular Biology and Biotechnology, University of Colombo, Sri Lanka

Breast cancer remains one of the prevalent malignancies affecting women worldwide. This study investigates the synergistic anticancer potential of triple-combinatorial phytotherapeutic agents, *Andrographis paniculata* and *Datura metel*, along with the chemotherapeutic drug doxorubicin (DOX), on estrogen-receptor-positive (MCF-7) and triple-negative (MDA-MB-231) breast carcinoma cells and normal breast epithelial cells (MCF-10A). The objective was to identify a synergistic drug–natural product combination that enhances cytotoxic efficacy while minimizing off-target toxicity. Sequential ultrasound-assisted extractions were performed using hexane, ethyl acetate, methanol, and aqueous-ethanol. SRB-based cytotoxic screening revealed that ethyl acetate extract of *A. paniculata* (AP) and methanolic extract of *D. metel* (DM) were most potent, demonstrating IC₅₀ values at 168.2 µg/mL (MCF-7) and 90.26 µg/mL (MDA-MB-231) for *A. paniculata*, and 0.23 µg/mL (MCF-7) and 21.59 µg/mL (MDA-MB-231) for *D. metel* after 72 h, with relatively low cytotoxicity toward MCF-10A. Bioactivity-guided fractionation of *A. paniculata* ethyl acetate extract was performed using normal-phase column chromatography with a 10% gradient solvent system consisting of hexane and ethyl acetate. Methanolic extract of *D. metel* was subjected to Kupchan's solvent-solvent partitioning to isolate active constituents. Fraction C8 of *A. paniculata* (AP-C8) exerted denotable cytotoxicity with IC₅₀ values at 32.99 ± 15.27 µg/mL on MCF-7 and 4.674 ± 0.73 µg/mL on MDA-MB-231 at 48 h post-treatment. The chloroform fraction of *D. metel* (DM-F2) demonstrated the highest cytotoxicity with IC₅₀ at 16.04 ± 0.33 µg/mL and 2.535 ± 0.09 µg/mL on MCF-7 and MDA-MB-231, respectively. Triple-combination treatments (DOX + AP-C8 + DM-F2) were assessed in various fixed dose ratios using the SRB assay. CompuSyn software analysis confirmed that the highest synergistic interactions were observed at a ratio of 1:64:256 on MCF-7 (combination index [CI]=0.71846) and at 1:1.25:10 on MDA-MB-231 (CI=0.77291). Both combinations demonstrated higher dose reduction index (DRI) values in a favorable range, especially for DOX, indicating potential for therapeutic dose minimization. Mainly, the combinations exhibited minimal cytotoxic effects in MCF-10A cells, supporting their selective anticancer potential in the selected combination ratios.

Keywords: *Synergism, Breast cancer, Andrographis paniculata, Datura metel, Doxorubicin*

Anti-cancer potential of a supercritical CO₂ extract of Vernolac nutraceutical, a viable polyherbal formulation

P. C. Rathnayake, S. R. Samarakoon, K. S. Senathilake

Institute of Biochemistry, Molecular Biology and Biotechnology, University of Colombo, Sri Lanka

Therapeutic resistance and adverse side effects limit the efficacy of conventional cancer treatments, highlighting the need for safer, more potent alternatives. Natural bioactive compounds have gained attention due to their synergistic mechanisms, low toxicity, and reduced potential for resistance. However, conventional extraction methods often fail to extract the spectrum of phytochemicals, which can lead to a loss of bioactive compounds. Supercritical CO₂ extraction provides a safer and more efficient alternative, yielding higher concentrations of active compounds. This study evaluated the anti-proliferative potential of an optimized supercritical CO₂ extract of 'Vernolac', a commercially available polyherbal nutraceutical containing aerial parts of *Vernonia zeylanica* and *Leucas zeylanica*, seeds of *Nigella sativa*, roots of *Hemidesmus indica*, and rhizomes of *Smilax glabra*. Cytotoxicity was assessed by using Sulforhodamine B (SRB) assay on Caco-2, MCF-7, NTERA-2 cl.D1, and normal MCF-10A cells. Induction of apoptosis was evaluated by acridine orange/ethidium bromide staining using fluorescence microscopy and caspase-3/7 activity assays. The scratch assay measured effects on cell migration, expression of apoptosis-related genes (*TP53*, *Survivin*), and autophagy-related gene *mTOR* was quantified and analysed using reverse transcriptase-quantitative PCR. Antioxidant capacity was measured using the DPPH assay, and intracellular ROS levels were determined using the nitroblue tetrazolium assay. The supercritical CO₂ extract showed potent cytotoxicity against NTERA-2 cl.D1 cells (IC₅₀ at 41.12 µg/mL, 48 h) with negligible toxicity toward MCF-10A cells (IC₅₀ > 1000 µg/mL). Based on these results, NTERA-2 cl.D1 cells were selected for further assays. The extract induced early apoptosis, as evidenced by fluorescence microscopy and elevated levels of caspase-3/7 activities. In Vernolac extract-treated cells, up-regulation of *TP53* expression and downregulation of *survivin* and *mTOR* expressions were evidenced, which confirms apoptosis regulation after Vernolac exposure. Additionally, the extract significantly inhibited cell migration and increased intracellular ROS levels. These findings demonstrate that the Vernolac extract possesses strong anticancer activity against cancer stem-like NTERA-2 cl.D1 cells, which supports its potential as a therapeutic candidate for targeting cancer stem cells.

Keywords: *Vernolac, Supercritical CO₂ extraction, Anti-proliferative, Nutraceutical, Cancer stem-like cell*

DC3B, a diterpene obtained from *Caesalpinia pulcherrima* modulates stemness in NTERA-2 cancer stem-like cells

D. M. D. C. Senavirathna, K. S. Senathilake, S. R. Samarakoon

Institute of Biochemistry, Molecular Biology and Biotechnology, University of Colombo, Sri Lanka

Cancer is a multi-stage, heterogeneous disease characterized by the uncontrolled proliferation of cells, leading to tissue invasion and metastasis. A growing body of evidence attributes the malignant traits of cancer, including therapy resistance and recurrence, to a subpopulation of tumor cells known as cancer stem cells (CSCs). CSCs possess stem-like properties such as self-renewal, differentiation, sphere formation, and high tumorigenic potential, making them critical contributors to metastasis and treatment failure. The effectiveness of modern cancer therapy is often limited by high toxicity and failure to eliminate CSCs. Natural products have long served as a valuable source of anticancer compounds due to their ability to modulate multiple signaling pathways with relatively lower toxicity. *Caesalpinia pulcherrima*, a plant widely used in traditional medicine, contains several bioactive compounds, among which 6 β -cinnamoyl-7 α -hydroxyvouacapen-5 α -ol (DC3B) has demonstrated significant antiproliferative activity across various cancer cell lines. Previous studies carried out at the Institute of Biochemistry, Molecular Biology and Biotechnology (IBMBB) revealed that DC3B inhibits the Wnt/ β -catenin pathway, a critical regulator of CSC maintenance, by disrupting β -catenin/TCF interactions. The present study aimed to investigate the stemness-modulating potential of DC3B using NTERA-2 cancer stem-like cells as an *in vitro* CSC model. Treatment with DC3B significantly reduced colony formation ($p < 0.0001$) indicating suppressed self-renewal. Gene expression analysis further revealed that DC3B markedly downregulated the expression of key stemness-associated genes, *OCT4*, *SOX2*, and *NANOG*. A substantial reduction in AKT2 expression was also observed, suggesting an additional mechanism by which DC3B may impair CSC characteristics through modulation of the PI3K/AKT pathway. Collectively, these findings highlight the potential of DC3B as a CSC-targeting therapeutic agent.

Keywords: *CSCs, Natural products, Wnt/ β -catenin, PI3K/AKT*

Extraction, characterization and optimization of marine algal-derived hydrogels for three-dimensional biomaterials

T. M. D. Darshanamala, U. Rajagopalan

Institute of Biochemistry, Molecular Biology and Biotechnology, University of Colombo, Sri Lanka

Marine algae are valuable sources of polysaccharides with wide ranging applications in biomaterial development. In the present study, four marine algae species, *Kappaphycus alvarezii*, *Sargassum* spp. (two species), and *Turbinaria conoides* were selected for evaluation as potential biomaterial sources. Identification of the algal species was made using morphological characteristics and molecular barcoding using *ITS* primers. Algal polysaccharides were extracted using the hot alkaline extraction method. Carrageenan was extracted from the red alga *K. alvarezii* with a high yield of 51.78%. Alginate was extracted from the brown algae with a yield weight of 42.65% and 42.59% from the two *Sargassum* spp. and *T. conoides* respectively. The chemical composition of the polysaccharide extracts was confirmed by fourier transform infrared (FTIR) spectroscopy, revealing characteristic sulphate ester peaks in carrageenan and guluronic and mannuronic acids in alginate. Optimization studies were conducted to enhance the properties of hydrogel formation. Parameters relevant to gelation properties were evaluated including solubility, gelation capacity and time, calcium chloride concentration, pH stability, swelling ratio, turbidity and melting and freezing temperatures. Optimum hydrogel formulations were achieved with 1.0 M CaCl₂ in carrageenan 2% (w/v) and with 0.5 M CaCl₂ in alginate 1% (w/v). The optimized hydrogel formulation combined high gel strength, low turbidity, stable swelling behaviour, and thermal stability suitable for physiological conditions. The materials produced in this study present a promising, sustainable, and biocompatible platform for future applications in biomedical engineering and advanced three-dimensional cell culture systems.

Keywords: *Algal hydrogels, Carrageenan, Alginate, Three-dimensional cell culture, Biomaterial*

Detection of serum levels of human telomerase reverse transcriptase (*hTERT*) mRNA in non-alcoholic steatohepatitis (NASH) related hepatocellular carcinoma (HCC) in Sri Lanka

U. L. Umar¹, A. S. Hewage¹, S. De Silva¹, S. Samarasinghe¹, K. H. Tennekoon¹,
R. C. Siriwardana², M. A. Niriella²

¹*Institute of Biochemistry Molecular Biology and Biotechnology, University of Colombo, Sri Lanka*

²*Colombo North Center for Liver Diseases, Faculty of Medicine, University of Kelaniya, Sri Lanka*

NAFLD is a spectrum that can progress from simple liver steatosis to NASH-HCC, which is the most advanced and life-threatening stage, with increasing incidence and prevalence globally. This is attributed to its several predisposing risk factors, including genetic factors. Dysregulation of one of the critical key driver genes called human telomerase reverse transcriptase (*hTERT*) was reported to influence HCCs' pathogenesis. Traditionally, *hTERT* catalyses the insertion of the short DNA sequences (TTAGGG) to newly replicated telomere ends during normal cell division. However, its overexpression prevents the hepatocytes from undergoing traditional apoptosis, making them immortal. Currently, there is no study on the impact of *hTERT* expression levels specifically from NASH-HCC patients in Sri Lanka. Hence, this study aimed to be the first study to quantify the serum level of *hTERT* mRNA from NASH-HCC patients, hoping to contribute to identifying it as a potential non-invasive diagnostic biomarker for early diagnosis of NASH-HCC. Quantitative PCR (qPCR) was used to quantify the expression of *hTERT* mRNA levels from NASH-HCC and cirrhotic age, BMI and gender-matched controls. The analysis revealed an elevated expression of *hTERT* mRNA in the NASH-HCC cohort, with a mean level of 9.11 ± 8.44 , representing a sevenfold increase compared to the cirrhotic age, BMI, and gender-matched controls, which exhibited a mean expression level of 1.3 ± 1.49 . Furthermore, alanine aminotransferase (ALT) and tumor nodularity correlated with *hTERT* mRNA expression from NASH-HCC patients. We noted higher expression of *hTERT* in NASH-HCC patients than in the cirrhotic matched-control cohort. However, it is recommended to further evaluate the link between *hTERT* mRNA expression levels and some of its predisposing genetic driving risk factors, such as pathogenic *hTERT* promoter's SNPs and related key transcription factors, using a larger sample size of NASH-HCC patients; this may suggest *hTERT* level as a promising NASH-HCC diagnostic biomarker.

Keywords: HCC, NASH-HCC, *hTERT* mRNA, Diagnosis, Biomarker

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Isolation of nitrogen fixing and phosphate solubilizing bacteria from diverse soil ecosystems

M. Prabakaran¹, L. N. R. Gunaratna¹, O. V. D. S. J. Weerasena¹, P. Premanandarajah²

¹*Institute of Biochemistry, Molecular Biology and Biotechnology, University of Colombo, Sri Lanka*

²*Department of Agricultural Chemistry, Faculty of Agriculture, Eastern University, Sri Lanka*

The plant growth promoting microorganisms stimulate the plant growth by enhancing nutrient uptake, nitrogen fixation and phosphate solubilization. However, the identification and application of indigenous soil bacteria with these potentials is at an emerging stage. The objective of the study was to isolate and identify high nitrogen fixing and phosphate solubilizing bacteria from different regions in Sri Lanka, to determine their potential in formulation of a biofertilizer. In this study, nitrogen-fixing and phosphate-solubilizing bacteria were isolated from soil samples collected from 11 geologically different locations, including paddy fields, coconut estates and agricultural lands. A total of 32 morphologically different bacteria were isolated after serially diluting soil samples and screening them on selective media (Burk's nitrogen-free medium and NBRIP agar medium) yielding 16 nitrogen-fixing and 18 phosphate-solubilizing isolates. Among them, two isolates—Isolate I-30 and Isolate I-25 showed the highest activities of nitrogen fixation and phosphate solubilization. Quantitative assays confirmed that Isolate I-30 released 70.03 mg/L of ammonia and solubilized 213.20 mg/L of phosphate, while Isolate I-25 released 54.92 mg/L of ammonia and solubilized 174.50 mg/L of phosphate. Using 16S rRNA gene sequencing, Isolate I-30 was identified as *Bacillus aryabhattai* and Isolate I-25 as *Priestia megaterium*. Both isolates are non-pathogens, and a bacterial antagonism assay indicated their compatibility by showing their non-antagonistic interaction. These results suggest that the combination of both isolates hold promise for biofertilizer formulation, to increase soil fertility and advance sustainable agricultural practices. The formulation is currently in progress.

Keywords: *Plant growth-promoting bacteria, Nitrogen fixation, Phosphate solubilization, Biofertilizer formulation*

Comparison of protein profiles of medically important vipers in Sri Lanka

R. M. T. N. Perera¹, Y. B. N. S. De Kotha¹, C. A. Gnanathanan², P. N. Weeratunga²

¹*Institute of Biochemistry, Molecular Biology and Biotechnology, University of Colombo, Sri Lanka*

²*Department of Clinical Medicine, Faculty of Medicine, University of Colombo, Sri Lanka*

Snakebite envenomation is a neglected tropical disease causing over 80,000 deaths globally each year. In Sri Lanka, approximately 80,000 bites and 400 deaths occur annually, mostly affecting rural communities. Russell's viper, Hump-nosed pit viper, and Saw-scaled viper are considered as the medically important vipers in Sri Lanka. Accurate identification of the envenomed species remains challenging due to overlapping clinical symptoms and the lack of species-specific diagnostic tools resulting in challenges in patient management. This study compared the protein profiles of the three viper venoms using SDS-PAGE. Crude venom (25 µg) of each viper was electrophoresed with 15% SDS-PAGE under reducing conditions at 60 V for 5 hours alongside pre-stained molecular weight marker (10-250 kDa). Proteins were visualized using Coomassie Brilliant Blue staining. SDS-PAGE analysis resulted in distinct protein banding patterns in all three venoms, and the detected proteins ranged from 10 to 118 kDa. Several conserved and species-specific venom components were identified in protein comparison. Common bands across all species were detected at 83, 39, 21 and 10–12 kDa positions and those could be possibly implicated as L-amino acid oxidase, snake venom metalloproteinase, snake venom serine protease, and phospholipase A2, respectively, consistent with previous literature. Unique proteins observed in Russell's viper ranged from 118 – 106 kDa and 58-68 kDa, in Hump-nosed pit viper between 47–37 kDa and 33–29 kDa, in Saw-scaled viper between 118 - 110 kDa. These differences highlight venom diversity with implications for venom-specific diagnostics and antivenom development.

Keywords: *Snakebite, Viper venom proteins, Russell's viper, Hump-nosed pit viper, Saw-scaled viper*

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Inhibition of the production of reactive oxygen and reactive nitrogen species in RAW 264.7 cells by aqueous extract of *Artocarpus heterophyllus*

W. G. M. C. H. Perera, B. A. D. Rukshala, N. N. Vijithsingh, S. M. Handunnetti

Institute of Biochemistry, Molecular Biology and Biotechnology, University of Colombo, Sri Lanka

Reactive nitrogen species (RNS) and reactive oxygen species (ROS) are highly reactive molecules that are secreted by immune cells, during inflammatory responses. ROS and RNS are required for host defense and intracellular signaling. However, overproduction of these can cause damage to macromolecules such as lipids, proteins and DNA leading to cellular damage and dysfunction as well as leading to oxidative and nitrosative stress potentially resulting chronic inflammatory diseases. Medicinal plant-based natural products are rich in flavonoid and phenolic compounds and have gained attention for their potential to modulate ROS and RNS production and to inhibit inflammation. Aqueous preparations of different parts of *Artocarpus heterophyllus* Lam. (Moraceae) are traditionally used in Sri Lankan medicinal practices for treatment of various diseases including immune related diseases such as skin diseases and asthma. In this study, aqueous root extract (ARE) of *A. heterophyllus* was used to determine its effect on ROS and RNS production in stimulated RAW 264.7 murine macrophages. Using MTT assay, ARE concentrations of 62.5-2000 µg/mL were determined as non-toxic to RAW cells and suitable to perform the inhibition assays. Inhibitory effects of ARE on ROS and RNS production in RAW cells were assessed by quantitative nitro blue tetrazolium and Griess assays respectively. ARE treatment significantly inhibited phorbol 12-myristate 13-acetate-stimulated ROS production and lipopolysaccharide-stimulated NO production in dose-dependent manner ($r=0.724$; $p<0.001$ and $r=0.686$; $p<0.001$ respectively). The highest inhibition of ROS production was $71.2\% \pm 0.65$ ($p<0.001$) at 2000 µg/mL of ARE with $IC_{50}=169.04$ µg/mL whereas highest inhibition of RNS production was $38.3\% \pm 4.9$ ($p<0.001$) at 2000 µg/mL of ARE. Further, a strong positive correlation was observed between ROS and RNS inhibition by ARE ($r=0.972$; $p=0.001$). These results demonstrate that ARE can effectively suppress macrophage-derived ROS and RNS validating its anti-inflammatory potential and the use of *A. heterophyllus* in indigenous medicinal practices for immune related diseases.

Keywords: *Artocarpus heterophyllus*, Anti-inflammatory activity, Reactive nitrogen species and Nitric oxide, RAW macrophages

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The *in vitro* effect of *Andrographis paniculata* on the viability and morphological changes induced by Vascular Endothelial Growth Factor on endothelial cells

J. K. Rodrigo¹, D. Jagoda², N. N. Vijithsingh¹, U. S. Wanigarathna¹

¹*Institute of Biochemistry, Molecular Biology and Biotechnology, University of Colombo, Sri Lanka*

²*Industrial Technology Institute, Colombo, Sri Lanka*

Vascular leakage, a hallmark of dengue hemorrhagic fever, is attributed to complex interactions between dengue viral (DENV) factors and the host immune response. Significantly elevated levels of Vascular Endothelial Growth Factor (VEGF) have been continuously reported in dengue hemorrhagic fever (DHF) patients, rendering it a potential biomarker of severity. Further, VEGF is known to drive the endothelial hyperpermeability, resulting in vascular leakage. *Andrographis paniculata* is a widely used medicinal plant in Sri Lankan traditional medicine, demonstrating promising antiviral activities against dengue. In this study, we examined its ability to modify the viability and morphological changes of the VEGF-induced EA.hy926 cells (EC). The effects of selected VEGF concentrations (50-2000 pg/mL) on EC were assessed using the Sulforhodamine B (SRB) assay, which were then compared with the results obtained after *A. paniculata* post-treatment. EC viability was >80% across all VEGF concentrations tested, indicating that VEGF was not toxic across all concentrations. Morphological observations revealed a prominent gap formation in the EC monolayer at high VEGF concentrations (>500 pg/mL), marking a 30-60% cell reduction in 50% of the observable view under the inverted light microscope at 20X magnification. The *A. paniculata* treatment of the VEGF-induced EC monolayer yielded over 80% EC viability at all VEGF concentrations (similar to that of VEGF-only). Further, the morphological observations revealed that VEGF-induced EC treated with *A. paniculata* maintained a tight monolayer with a 5-20% increase in the number of cells observed under the microscope than at high VEGF. These results show that *A. paniculata* post-treatment had effectively reversed the VEGF-induced morphological changes of the EC monolayer, highlighting its potential therapeutic use in DHF.

Keywords: *Dengue, VEGF, Andrographis paniculata, Endothelial hyperpermeability, Vascular leakage*

Acknowledgements: This work was supported jointly by the MSc program in Cellular and Molecular Immunology, IBMBB, University of Colombo and authors JKR.

Comparative analysis of flavonoid composition and expression of flavonoid biosynthesis enzymes in *Clitoria ternatea* varieties

S. Shanmugaprabha, P. A. N. Punyasiri, O. V. D. S. J. Weerasena, L. N. R. Gunarathne

Institute of Biochemistry, Molecular Biology and Biotechnology, University of Colombo, Sri Lanka

Clitoria ternatea is a medicinal plant valued for its flavonoid profile and pharmacological properties, including antioxidant, antimicrobial, and anti-inflammatory activities. Although the blue-flowered variety, characterized by anthocyanins such as delphinidin derivatives, has been studied extensively, biochemical and molecular differences among flower colour variants remain less understood. This study aims to compare flavonoid composition and expression of key biosynthetic enzymes: dihydroflavonol 4-reductase (DFR), anthocyanidin synthase (ANS), and flavonol synthase (FLS) in blue, purple, and white-flowered varieties. Flavonoids were extracted from flowers and leaves and quantified via HPLC using authenticated standards of myricetin, quercetin, kaempferol, luteolin, apigenin, delphinidin, and cyanidin. Gene-specific primers for DFR, ANS, and FLS were designed, and relative expression was analyzed by RT-qPCR using the Livak method, with the white variety as calibrator due to its minimal pigmentation. Reference gene primers were adapted from a validated study and verified against the *C. ternatea* genome (PRJNA1016062; accession KAK7264054.1). Myricetin and kaempferol were more abundant in leaves, whereas quercetin and luteolin were higher in flowers. Quercetin content was highest in the white variety and lowest in the blue. Apigenin predominated in leaves, delphinidin was exclusive to blue flowers, and cyanidin was absent in all samples. DFR was upregulated in blue (18.176-fold) and purple (4.257-fold) relative to white flowers. ANS was upregulated in blue (2.488-fold) but downregulated in purple (0.595-fold) flowers. FLS remained relatively stable (0.765 and 0.883-fold in blue and purple flower varieties respectively) and slightly downregulated across all variants. Due to limited reagents and time, p-values were not generated. Blue flowers exhibit high ANS and DFR expressions, which promotes the production of anthocyanin, particularly delphinidin, responsible for their blue coloration. Purple flowers exhibit moderate DFR but downregulated ANS, indicating alternative pigment or regulatory pathways despite visible pigmentation. White flowers display higher FLS expression, favouring flavonol synthesis over anthocyanins, consistent with their elevated flavonol content, highlighting gene-specific contributions to flower colour variation.

Keywords: *Clitoria ternatea*, Flavonoids, Dihydroflavonol 4-reductase, Anthocyanidin synthase, Flavonol synthase

In vivo* pharmacokinetic and tissue distribution studies of a natural anticancer diterpene isolated from *Caesalpinia pulcherrima

S. D. V. Gunawardane, E. A. Oshadi, P. K. S. Wijerathne, P. A. N. Punyasiri,
K. S. Senathilake, U. Rajagopalan, S. R. Samarakoon

Institute of Biochemistry, Molecular Biology and Biotechnology, University of Colombo, Sri Lanka

A cassane-type diterpene, 6 β -Cinnamoyl-7 α -hydroxyvouacapen-5 α -ol (DC3B), is isolated from *Caesalpinia pulcherrima* and has demonstrated promising *in vitro* anticancer potential. This study aimed to evaluate the pharmacokinetics and tissue distribution of DC3B in male Wistar rats. A reverse-phase high-performance liquid chromatography method (RP-HPLC/UV) was developed and validated according to the United States Food and Drug Administration (US FDA) guidelines for bioanalytical method validation, using a C18 column with a methanol-water gradient and UV detection at 275 nm. DC3B and the internal standard (propyl paraben) eluted at 8 and 4 min, respectively. The RP-HPLC method was fully validated for specificity, selectivity, linearity ($R^2 > 0.999$), sensitivity, accuracy, precision, extraction recovery, matrix effect, carryover, and dilution integrity across all matrices. The validated HPLC method was applied to quantify DC3B in rat plasma and tissues. DC3B was administered orally at a single dose of 200 mg/kg using corn oil as the vehicle. Plasma and tissue samples were collected at 0.5, 1, 2, 3, 4, 5, 6, 7, 8, 10, 12, 16, and 24 h post-dose. The compound was absorbed with a T_{max} of 4 h, a C_{max} of 1314.12 ± 31.41 ng/mL, and a plasma elimination half-life ($t_{1/2}$) of 1.37 h in plasma. DC3B was distributed to major organs, with peak concentrations (C_{max}) observed in the liver (1752.41 ng/mL), stomach (27549.02 ng/mL), small intestines (23377.15 ng/mL), lungs (1139.84 ng/mL), kidneys (702.47 ng/mL), heart (1807.90 ng/mL), and spleen (704.56 ng/mL). Notably, DC3B penetrated sanctuary sites such as the brain and testes, with C_{max} of 408.94 and 2881.99 ng/mL, respectively. Although DC3B exhibited delayed absorption, it demonstrated substantial and widespread tissue distribution. Its accumulation in the above organs highlights its capacity to reach protected or metastatic niches, reinforcing its potential as a cancer stem cell-targeting agent. These findings support oral administration as a viable route and underscore the need for formulation and dosing strategy refinements to improve systemic exposure and therapeutic outcomes.

Keywords: *Cassane diterpene, Caesalpinia pulcherrima, Pharmacokinetics, Tissue distribution, RP-HPLC/UV*

Development of a colorimetric RT-LAMP assay with novel primers for detection of Dengue virus in *Aedes aegypti* mosquitoes

M. D. S. Janaki^{1,2}, I. Sanchez-Vargas³, O. C. Ratnayake³, S. Elmegeghi³,
O. V. D. S. J. Weerasena¹, V. S. Aryaprema⁴, N. Fernando¹, S. M. Handunnetti¹,
P. P. S. L. Pathirana¹, H. A. Tissera⁵, J. Rovnak³, R. Perera³

¹*Institute of Biochemistry, Molecular Biology and Biotechnology, University of Colombo, Sri Lanka*

²*National Dengue Control Unit, Ministry of Health, Public Health Complex, Colombo 05, Sri Lanka*

³*Center for Vector-borne Infectious Diseases, Colorado State University, USA*

⁴*Anastasia Mosquito Control District, Florida, USA*

⁵*Epidemiology Unit, Ministry of Health, De Saram Place, Colombo 10, Sri Lanka*

Dengue poses a threat to public health both globally and locally. Rapid detection of the Dengue virus (DENV) in mosquitoes is crucial for prompt and proactive control measures and interventions. Reverse Transcription Loop-mediated Isothermal Amplification (RT-LAMP) provides a rapid, sensitive, and affordable solution for this purpose. RT-LAMP for detection of all four DNV serotypes using 24 primers (6 primers per each serotype) is currently available. The objective of this study was to find out the possibility of developing a new RT-LAMP assay by reducing the number of primers required. A comprehensive bioinformatic analysis was carried out using Geneious software to identify a conserved region in all four serotypes (DENV 1-4). However, consistently conserved regions for all serotypes was not found to develop a simple assay to detect all four serotypes. Therefore, based on previous studies which targeted 3' untranslated region (3'UTR) of DENV 2, two separate sets of primers (5 primers per each set) were designed; Primer set 1 using Eiken's Primer Explorer V4 and primer set 2 using NEB LAMP Primer Design Tool. Both primer sets were assessed using RNA from cultures of all four dengue serotypes and WarmStart Colorimetric LAMP master mix (NEB, USA) including UDG and Syto 9 green, fluorescent dye. Primer set 1 showed positive colour changes and peak amplifications specificity only for DENV 2 RNA within 40 min. Primer set 2 showed positive reactions with DENV 2 first, followed by DENV 3 and 4, within 40 min. Based on the results primer set 2 (5 primers) was selected and as a further development, DNV 1 detection primer set (6 primers) from above currently available LAMP assay was added for the detection of DNV 1. However, when the assay was conducted with extracts (homogenates) from *Aedes aegypti* mosquitoes infected with each of the four serotypes, the assay was positive only with extracts of mosquitoes infected with DENV 1 or 2, indicating that mosquito extracts resulted in weaker reactions compared to purified viral RNA, emphasizing the need for further optimization of the assay with the novel primers.

Keywords: *Dengue, Dengue virus serotypes, RT-LAMP, Aedes aegypti, Primer optimization*

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QSAR-driven discovery of novel anticancer derivatives from a natural halogenated scaffold

R. M. R. K. Rathnayaka¹, K. H. Tennekoon¹, D. S. Gunasekara²

¹*Institute of Biochemistry, Molecular Biology and Biotechnology, University of Colombo, Sri Lanka*

²*New Frontier Bio, 48 Denham Street, Beverly, MA 01915, USA*

Natural halogenated compounds have emerged as promising scaffolds for anticancer drug discovery. A previously reported halogenated compound (CMF) from *Mangifera zeylanica*, an endemic plant of Sri Lanka, demonstrated selective cytotoxic activity against triple-negative breast cancer cells (MDA-MB-231; IC₅₀ < 50 µg/mL), with lesser cytotoxicity towards normal breast epithelial cells (MCF-10A; IC₅₀ = > 100 µg/mL). However, its moderate potency limited its therapeutic potential. Therefore, the present study aimed to improve the anticancer efficacy of CMF. A quantitative structure–activity relationship (QSAR) model was developed to predict the activity profiles of structurally modified predicted derivatives of CMF. Computational screening revealed several candidate molecules with higher predicted activity compared to the parent compound. Guided by these results, selected derivatives were synthesized using standard synthetic protocols and structurally characterized. *In vitro* cytotoxicity assays demonstrated that these novel derivatives exhibited significantly enhanced activity against MDA-MB-231 cells while maintaining favourable selectivity over MCF-10A cells. These findings validate the predictive power of the QSAR model and highlight the value of integrating computational design with synthetic chemistry to optimize natural product–derived anticancer leads. This study establishes three among ten synthesized halogenated derivatives (Compounds K1, K2, and K3) of CMF, as potential candidates for further development against TNBC, a highly aggressive breast cancer subtype lacking effective targeted therapies.

Keywords: *Mangifera zeylanica*, triple-negative breast cancer, QSAR, Natural product derivatives, Drug design

Preliminary genetic analysis of selected PYGL variants in two children with Glycogen Storage Disease Type VI in Sri Lanka

S. Nadaraja¹, S. De Silva¹, S. Hewage¹, N. Punyasiri¹, E. Jasinge², D. Warawita³

¹*Institute of Biochemistry, Molecular Biology and Biotechnology, University of Colombo, Sri Lanka*

²*Lady Ridgway Hospital for Children, Colombo, Sri Lanka*

³*Faculty of Medicine, University of Colombo, Sri Lanka*

Glycogen Storage Disease Type VI (GSD VI), or Hers disease, is a rare autosomal recessive metabolic disorder resulting from pathogenic variants in the *PYGL* gene, which encodes liver glycogen phosphorylase, an essential enzyme in glycogenolysis. Despite its clinical significance, the genetic landscape of GSD VI remains largely unexplored within the Sri Lankan population. The current study aimed to conduct a preliminary molecular investigation by screening three selected *PYGL* variants: c.280C>T, c.434T>G, and c.1620+1G>A in two pediatric patients clinically diagnosed with GSD VI. Genomic DNA was extracted from peripheral blood samples, followed by primer design, polymerase chain reaction (PCR) optimization, and Sanger sequencing. Both patients presented with classical clinical features, including hepatomegaly and elevated hepatic transaminases; however, none of the targeted *PYGL* variants were identified in either patient. These findings suggest potential genetic heterogeneity and the likelihood of uncharacterised or novel *PYGL* mutations within the Sri Lankan cohort. The current study can be extended to develop a mutation spectrum for GSD VI, thereby improving genetic testing and counselling, which may assist in treatment management for affected individuals in Sri Lanka.

Keywords: *Glycogen Storage Disease (GSD), GSD Type VI, PYGL gene, Liver glycogen phosphorylase and hepatomegaly*

Isolation and molecular identification of lipase producing bacteria in natural oil substrates

A. M. P. Wickramaratna, O. V. D. S. J. Weerasena, L. N. R. Gunaratna

Institute of Biochemistry, Molecular Biology and Biotechnology, University of Colombo, Sri Lanka

Lipases are biocatalysts with deserving ability to catalyze hydrolysis (of triglycerides), esterification (between free fatty acids and alcohols) and transesterification (between esters and alcohols) reactions under mild conditions. The increasing demand for lipases across various industries highlights the need of microbial sources that are capable of producing high enzyme yield and activity. The main objective of this study was the isolation and molecular identification of the lipase producing bacteria from natural oil substrates; coconut, peanut, corn and grated coconut meat residue (GCMR). Different bacterial isolates obtained from oil substrates were cultured separately in nutrient agar (NA) medium. Bacterial isolates were then screened for lipase activity using phenol red and tributyrin agar media. The isolate obtained from corn demonstrated highest lipase activity and the activity was further assessed quantitatively (as 153.48 U/mL) by spectrophotometric assay, using p-nitrophenyl palmitate (pNPP) as the substrate. The highest lipase producing bacterium was subjected to molecular identification. The bacterial deoxyribonucleic acid (DNA) was extracted using modified boiled cell method and the 16S rRNA universal barcoding region was amplified by polymerase chain reaction (PCR). The amplicon was sequenced bidirectionally and the sequence was searched over GenBank database using Basic Local Alignment Search Tool (BLAST). The bacterium was identified as *Staphylococcus pasteurii*. The lipase produced by the bacteria was partially purified using ammonium sulfate precipitation. The results demonstrate that the potential of *Staphylococcus pasteurii* as efficient microbial sources of enzyme lipase, highlighting their relevance in future industrial and biotechnological applications.

Keywords: *Lipase, Staphylococcus pasteurii, Molecular identification*

Anti-inflammatory, antibacterial activity and chemical composition of essential oil extracted from *Citrus aurantium* L. leaves using solvent-free microwave extraction technique

D. Jagoda^{1,2}, G. D. Liyanaarachchi¹, N. Fernando², S. M. Handunnetti², H. D. Weeratunge¹, W. Divisekera¹, J. K. R. R. Samarasekera¹

¹Industrial Technology Institute, 363, Bauddhaloka Mawatha, Colombo 07, Sri Lanka

²Institute of Biochemistry, Molecular Biology and Biotechnology, University of Colombo, Sri Lanka

Citrus aurantium is known for its therapeutic properties in managing inflammation associated with disease conditions. Its essential oil (EO) is valued for antiseptic, antimicrobial, astringent properties and is used in aromatherapy, to alleviate anxiety and pain. This study presents the first systematic evaluation of the chemical composition, anti-inflammatory and antibacterial activity of EO extracted from the leaves of *C. aurantium*, using solvent-free microwave extraction (SFME) technique. Fresh leaves (200 g) were subjected to SFME using the NEOS GR microwave extractor to obtain the EO. Gas Chromatography-Mass Spectrometry (GC-MS) was used to analyze the chemical composition. Anti-inflammatory activity was evaluated by the inhibitions of enzymes arachidonate 5-lipoxygenase (A5-LOX), arachidonate 15-lipoxygenase (A15-LOX) activities, and inhibition of nitric oxide (NO) production in LPS-stimulated RAW 264.7 macrophages. Antibacterial activity of EO was evaluated by agar well diffusion method against *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Bacillus subtilis*, *Salmonella typhimurium*, and *Candida albicans*. GC-MS analysis identified D-limonene (25.35%) and α -Citral (17.00%) as major compounds in *C. aurantium* EO. Dose-dependent inhibitions of A5-LOX and A15-LOX activities were recorded with IC₅₀ values of 6.97 $\pm$ 0.85 and 411.24 $\pm$ 2.23 μ g/mL respectively ($r=0.995$ & 0.979 ; $p<0.05$) which were significantly higher compared to the reference standard baicalein (IC₅₀: 2.09 $\pm$ 0.19 μ g/mL; $p<0.05$). The *C. aurantium* EO dose-dependently inhibited NO production ($r=0.987$; $p<0.05$), with 74.44 $\pm$ 0.58% inhibition at a non-toxic concentration of 1000 μ g/mL in LPS-stimulated RAW 264.7 cells, with IC₅₀ value of 391.06 $\pm$ 31.43 μ g/mL. The EO exhibited moderate antimicrobial activity with an inhibition zone of 10 mm for both *E. coli*, and *B. subtilis* at 1000 μ g/mL compared to the standard antibiotic, ciprofloxacin (5 mcg/disc). These findings on significant inhibition of A5-LOX, and NO production may support the therapeutic potential of *C. aurantium* leaf EO and emphasize the importance of sustainable and efficient extraction methods for its industrial applications in pharmaceuticals and cosmetics.

Keywords: Solvent-free microwave extraction, Gas Chromatography-Mass Spectrometry, Essential oil, Anti-inflammatory activity

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Comparison of diagnosis of Leptospirosis by microscopic agglutination test and polymerase chain reaction

P. D. Gangani¹, Y. de Silva¹, N. Fernando¹, S. Rajapakse², S. Premawansa³,
S. M. Handunnetti¹

¹*Institute of Biochemistry, Molecular Biology and Biotechnology, University of Colombo, Sri Lanka*

²*Postgraduate Institute of Medicine, University of Colombo, Sri Lanka*

³*Department of Zoology and Environment Sciences, Faculty of Science,
University of Colombo, Sri Lanka*

Leptospirosis is a zoonotic disease caused by spirochaetes of genus *Leptospira*. Sri Lanka is considered as a hotspot for leptospirosis. Leptospirosis includes wide spectrum of clinical features ranging from mild fever to multi-organ dysfunction which mimics many other infectious diseases. The objective of this study was to detect *Leptospira* DNA using *flaB* nested PCR in a set of patient samples (n=105) which had been previously tested for leptospirosis using Microscopic Agglutination Test (MAT). Patient blood samples collected during May 2012 and October 2014, having days of onset of symptoms <10 and clinically characterised as severe or mild were used. MAT positivity was considered as having a titer of ≥ 400 in acute serum, a four-fold rise in MAT titer between acute and convalescent sera and seroconversion ≥ 100 in paired sera. DNA was extracted from whole blood samples and *flaB* nested PCR was carried out as described previously. Of the 105 samples, 75 (71%) showed MAT positivity and 41 samples (39%) were positive in *flaB* nested PCR. No significant differences were observed in days of onset of symptoms in both MAT positive and negative patients as well as PCR positive and negative patients. Within the MAT positive group, 45% were negative by *flaB* nested PCR. Among the MAT positive patients, the proportion of PCR positive, severe leptospirosis patients (68%) was significantly higher than those who were PCR positive and having mild leptospirosis ($p < 0.005$). Considering MAT as a reference standard, *flaB* nested PCR showed 54.66% sensitivity and 100% specificity. Together, these findings are consistent with previous studies indicating that a combination of positivity through MAT and PCR is more suitable as a diagnostic option for confirming leptospirosis which is defined as a biphasic infection.

Keywords: *Leptospira*, Sri Lanka, Microscopic Agglutination Test, *flaB* nested PCR, Days of symptoms

Acknowledgements: This work was supported by the ICGEB CRP/LKA17-01 and NRC-17-098 grants awarded to SH.

Therapeutic potential of a nutraceutical formula (Vernolac) in cancer therapy through integrated network pharmacology and computational simulations approach

S. D. V. Gunawardane, M. M. Milhan, P. C. Rathnayaka, P. S. Gurusinghe, K. S. Gunaratne, A. Kanagasundaram, T. M. D. Darshanamala, D. C. Senevirathne, K. S. Senathilake, S. R. Samarakoon

Institute of Biochemistry, Molecular Biology and Biotechnology, University of Colombo, Sri Lanka

Vernolac is a commercially available polyherbal nutraceutical formulation comprised *Vernonia zeylanica* aerial parts, *Nigella sativa* seeds, *Hemidesmus indicus* roots, *Leucas zeylanica* aerial parts, and *Smilax glabra* rhizome. The present study employed an integrative network pharmacology-based approach with *in vitro* validation to explore the anticancer potential of Vernolac. Phytochemicals present in Vernolac were retrieved from public databases and filtered based on drug-likeness using SwissADME. Protein targets of phytochemicals were predicted using SwissTargetPrediction and intersected with cancer-related targets retrieved from GeneCards to identify common targets. Common targets were used to construct a protein-protein interaction network using the STRING database and analyzed in Cytoscape to identify core targets based on degree. Clustering, topology, hub node analysis, and formula-herb-compound-target-disease network construction were performed on core targets using Cytoscape. Gene Ontology (GO) and Kyoto Encyclopedia of Genes and Genomes (KEGG) enrichment analysis were performed to identify key pathways regulated by phytochemicals in Vernolac. Molecular docking and dynamics simulations were conducted to evaluate the binding affinities of key ligand-target interactions. The *in vitro* antiproliferative activity of Vernolac was assessed in MCF-7, Caco-2, NTERA-2 cl.D1, and MCF-10A, using the Sulforhodamine B assay. A total of 155 drug-like phytochemicals and 137 core overlapping targets were identified. Key phytochemicals, including vernolactone, thymoquinone, quercetin, nigellidine, and carvacrol, were found to interact with key hub nodes, including AKT1, BCL2, CASP3, CTNNB1, EGFR, JUN, SRC, TNF, and STAT3. Pathway enrichment analyses indicated a significant involvement of targets in multiple cancers, such as prostate, endometrial, bladder, pancreatic cancer, and leukemia. The molecular docking and dynamics simulation studies identified novel target-ligand interactions. *In vitro* experiments demonstrated substantial antiproliferative activity against Caco-2 ($IC_{50} = 173.2 \mu\text{g/mL}$), MCF-7 ($IC_{50} = 124.5 \mu\text{g/mL}$), and NTERA-2 cl.D1 ($IC_{50} = 61.5 \mu\text{g/mL}$), while sparing normal MCF-10A cells ($IC_{50} = 1075 \mu\text{g/mL}$). Vernolac may exert anticancer effects through apoptosis induction, immune modulation, antioxidant, anti-inflammation, antiproliferative, and chemoradiosensitizing mechanisms. This study suggests that Vernolac may exhibit chemoradioprotective potential by alleviating therapy-induced toxicity, supporting its promise as a potential adjunct to conventional cancer treatments.

Keywords: *Nutraceuticals, Cancer, Network pharmacology, Molecular docking, Molecular dynamics simulation*

Synergistic effects of triple combination therapy with thymoquinone, *Datura metel* and *Andrographis paniculata* extracts on the proliferation of human lung cancer cells

M. M. Milhan

Institute of Biochemistry, Molecular Biology and Biotechnology, University of Colombo, Sri Lanka

Lung cancer remains one of the leading causes of cancer-related mortality worldwide. Conventional therapeutics often exhibit limitations in providing complete cure for cancer and occurrences of drug resistance is evidenced in solid tumors. Combination therapies that target multiple oncogenic pathways have emerged as a promising strategy to overcome chemo-resistance and minimize treatment-associated toxicity. Thymoquinone (TQ), a bioactive compound derived from *Nigella sativa*, has been reported for its potent anti-cancer properties. *Datura metel* (DM) and *Andrographis paniculata* (AP) are medicinal plants, containing several compounds with anti-cancer properties. Therefore, this study investigated the synergistic anti-proliferative effects of TQ in combination with *D. metel* and *A. paniculata* extracts against human lung cancer cells (NCI-H292). Using sequential ultrasound-assisted extraction, aerial parts and leaves were extracted with hexane, dichloromethane, ethyl acetate, and methanol. SRB-based cytotoxic screening revealed that ethyl acetate extract of *A. paniculata* and dichloromethane extract of *D. metel* were most potent, demonstrating IC₅₀ values at 53.46 µg/mL and 63.04 µg/mL at 24 h exposure, respectively. Triple combination treatments in nine different combination ratios (from 1:1:1 to 16:16:1) were assessed using SRB assay. Synergistic interactions were quantified using CompuSyn and SynergyFinder software. The combination 2:2:1 of TQ:DM:AP demonstrated prominent cytotoxicity (IC₅₀ values at 2.411 µg/mL) and strong synergistic effects with combination index values of 0.466 (CI < 1) at fractional affected (Fa) 0.5. This synergistic combination showed remarkable drug reduction index (DRI) values of 2.793, 65.234, and 25.684 for TQ, DM, and AP, respectively, demonstrating substantial dose reduction potential while maintaining cytotoxic efficacy. SynergyFinder analysis further confirms these findings, with all four reference models yielding negative scores with synergism (ZIP: -11.52, Loewe: -1.45, HSA: -0.62, Bliss: -10.96), indicating prominent synergistic interactions. This finding demonstrates the potential of the selected triple combination to be developed as an improved therapeutic agent against lung cancer.

Keywords: *Synergism, Lung cancer, Thymoquinone, Andrographis paniculata, Datura metel*

POSTGRADUATE INSTITUTE OF INDIGENOUS MEDICINE (PGIIM)



Preserving Heritage through Quality Research

17th and 18th October 2025

MESSAGE FROM THE DIRECTOR/SYMPOSIUM CHAIR

Professor S. M. S. Samarakoon

*Postgraduate Institute of Indigenous Medicine
University of Colombo
Sri Lanka*



The Postgraduate Institute of Indigenous Medicine (PGIIM) is the premier institution in Sri Lanka for postgraduate education in traditional medicine, functioning under the University of Colombo. PGIIM offers MD programmes across all three major traditional medical systems; Ayurveda, Siddha, and Unani with qualifications recognized as equivalent to a doctoral degree under the Sri Lanka Qualifications Framework (SLQF). Currently, PGIIM conducts five MD programmes in Ayurveda and one MD programme in Unani Medicine, with plans underway to launch six more MD programmes soon.

In its continued commitment to fostering research and knowledge dissemination, PGIIM has organized its International Symposium on Ayurveda, Unani, and Siddha Medicine (ISAUS 2025) for the second consecutive year. Building on the success of the inaugural symposium held last year, this year's event is themed: "Preserving Heritage through Quality Research", a timely and critical focus in the Sri Lankan context. The symposium features four key thematic areas: Clinical Research on Traditional Medicine, Health Promotion through Traditional Medicine, Health and Wellness Tourism through Traditional Medicine, and Traditional Medicine-based Nutraceuticals and Pharmaceuticals. More than 50 research papers are scheduled for presentation during the scientific sessions, reflecting the growing academic interest and rigorous scholarship in this field. The event is further enriched by the presence of eminent scholars and renowned physicians, who will deliver keynote addresses and share their valuable insights.

As the Director of PGIIM and Chair of the Symposium, I am honoured to extend a warm welcome to researchers, scientists in Indigenous Medicine and allied disciplines, and delegates from India and beyond to this valuable academic gathering. Your participation will undoubtedly contribute to the advancement of traditional medicine not only in Sri Lanka, but across the region.

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Ms. L. L. H. T. Alwis (Management Assistant)

Ms. S. V. Sinduja (Management Assistant)

Ms. J. M. D. M. Jayasundara (Management Assistant)

Ms. A. D. W. Jayamini (Management Assistant)

Ms. D. P. T. P. Diyunugala (Management Assistant)

Mr. M. A. I. C. Munasinghe (Technical Officer)

Mr. K. G. Sajitha Dilanka (Works Aide)

SYMPOSIUM PROGRAMME

1.45 pm – 2.00 pm	Arrival of Guests and Participants
2.00 pm – 2.10 pm	Lighting the Oil Lamp with Saraswati Pooja
2.10 pm – 2.20 pm	PGIIM Introductory Video
2.20 pm – 2.30 pm	Welcome Address <i>Prof. S. M. S. Samarakoon</i> <i>Director/Symposium Chair</i> <i>Postgraduate Institute of Indigenous Medicine</i>
2.30 pm – 2.40 pm	Address by the Chief Guest <i>Prof. Indika Mahesh Karunathilake</i> <i>Vice-Chancellor</i> <i>University of Colombo</i>
2.40 pm – 3.00 pm	Address by Guest of Honour <i>Prof. P. K. Bharadwaj</i> <i>Chancellor, Sparsh Himalaya University Dehradun</i> <i>Uttarakhand, India</i>
3.00 pm – 3.05 pm	Unveiling the Symposium Proceedings
3.05 pm – 3.25 pm	Keynote Address – I <i>Senior Prof. Priyani Asoka Paranagama</i> <i>Dean, Faculty of Graduate Studies</i> <i>University of Kelaniya</i>
3.25 pm – 3.30 pm	Cultural Event
3.30 pm – 3.50 pm	Keynote Address – II <i>Dr. L. P. A. Karunathilake</i> <i>Veteran Ayurveda Surgeon, Former Head of Ayurveda Section &</i> <i>Additional Director of Postgraduate Unit, IIM University of</i> <i>Colombo</i>
3.50 pm – 4.00 pm	Vote of Thanks <i>Mr. D. G. R. L. Gunarathna</i> <i>Symposium Coordinator</i>
	National Anthem
4.00 pm – 4.30 pm	Refreshments

INTRODUCTION TO THE KEYNOTE SPEAKER – I

Senior Professor (Chair) Priyani Asoka Paranagama

*Dean, Faculty of Graduate Studies
University of Kelaniya
Sri Lanka*



It is a great honour to introduce Senior Professor P. A. Paranagama, an eminent academic and researcher, who currently serves as the Dean of the Faculty of Graduate Studies, University of Kelaniya. Professor Paranagama holds a BSc and an MPhil in Chemistry from the University of Kelaniya and earned her PhD in Chemistry from the University of Glasgow, United Kingdom.

A distinguished scholar, Professor Paranagama's pioneering research has greatly advanced the fields of natural product chemistry and indigenous medicine. Her expertise spans the development of value-added products from indigenous medicine, isolation and characterization of bioactive compounds from endolichenic fungi, value addition of essential oils and spices, and the development of bio pesticides for agricultural pest control in Sri Lanka. She has also made significant contributions to understanding the mode of action of bio pesticides, which has strengthened sustainable agricultural practices.

Professor Paranagama has an impressive record of academic leadership. She has served as the Dean of the College of Chemical Sciences at the Institute of Chemistry Ceylon in 2016, and from 2018 to 2023, as the Director of Indigenous Medicine at the University of Colombo. Since 2012, she has also held the prestigious position of Chair of Chemistry at the Department of Chemistry, University of Kelaniya.

With her remarkable blend of academic excellence, leadership, and innovative research, Senior Professor P. A. Paranagama continues to inspire both the academic community and the wider scientific world. We are privileged to welcome her today as our Keynote Speaker.

ABSTRACT OF THE KEYNOTE ADDRESS – I

Bridging the Gap between Traditional Medicine and Modern Science in Sri Lanka

Senior Professor Priyani Asoka Paranagama

Dean, Faculty of Graduate Studies, University of Kelaniya, Sri Lanka

Indigenous medicine has served as a foundation of healthcare across the world, particularly in regions enriched with long-standing ethnomedical traditions. Systems such as Ayurveda, Unani, and Siddha have relied on herbal formulations for centuries, offering proven remedies for a variety of ailments. While this traditional knowledge has shown immense therapeutic value, integrating it into modern healthcare frameworks requires improvements in product quality and bioactivity to guarantee safety, efficacy, and reproducibility.

Ongoing research is dedicated to establishing systematic methods for strengthening indigenous medicinal products. These efforts focus on standardization, scientific validation, and innovative formulation strategies. Key priorities include identifying bioactive compounds from underutilized medicinal plants, refining extraction techniques to enhance yield, and applying robust quality control tools like chromatographic and spectroscopic analyses. Emerging technologies including nanotechnology and targeted drug delivery are also being explored to increase the bioavailability and therapeutic effectiveness of herbal preparations.

Equally important is the preservation of traditional knowledge, ensuring that modern science complements rather than replaces these practices. Sustainability is emphasized through the responsible sourcing of raw materials, minimizing variability across production batches, and aligning with international regulatory requirements. Practical demonstrations, such as poly herbal formulations and poly herbal mineral formulations showcase how process optimization can significantly improve antioxidant, anti-inflammatory, antidiabetic and anti-acetylcholine esterase activities.

By harmonizing ancient wisdom with contemporary science, this work aspires to strengthen the global credibility and acceptance of indigenous medicine as a reliable healthcare option. Enhancing product quality and bioactivity not only bolster consumer trust but also supports the economic advancement of local communities engaged in cultivating and processing medicinal plants. Ultimately, these initiatives highlight the potential of indigenous medicine to provide sustainable solutions to both present and future health challenges worldwide.

INTRODUCTION TO THE KEYNOTE SPEAKER – II

Dr. L. P. A. Karunathilake

*Former Additional Director (Postgraduate), and
former Head of the Ayurveda Section
Institute of Indigenous Medicine
University of Colombo
Sri Lanka*



Dr. L. P. A. Karunathilake, DAMS (Hon) from the University of Colombo, obtained his MD in Ayurveda (Shalya) from Banaras Hindu University, India, and his PhD in Ayurveda (Shalya) from Gujarat Ayurveda University, India. He has held several senior academic and administrative positions, including Senior Lecturer at the Institute of Indigenous Medicine (IIM), University of Colombo, and Senior Consultant Surgeon at the Ayurveda Teaching Hospital, Borella, and Additional Director (Postgraduate) of the IIM. He has also served as Head of the Ayurveda Section, the Department of Shalya Shalakya, and the Department of Shareera Rachana, while contributing as a visiting lecturer at Gampaha Wickramarachchi University of Indigenous Medicine. His leadership extended beyond academia as President of the Teachers' Association at IIM, Chairman of the Ayurveda Teaching Hospital Committee appointed by the Ministry of Indigenous Medicine, Director of the Consumer Affairs Authority under the Ministry of Trade and Marketing Development, and member of the Sri Lanka Export Development Board promoting Ayurveda services abroad. Dr. Karunathilake has supervised several postgraduate candidates, including PhD, MPhil, and MD researchers, and guided MBBS electives at the University of Colombo. He has been internationally recognized with prestigious honours such as the *National Susrutha Rathna Award* (India, 2008), inclusion in the *Millennium Register of Sri Lankan Personalities* (2006), and the *Twentieth Century Award for Achievement* from the International Biographical Centre, Cambridge. His global academic contributions include invited lectures at Kaushalya Bharati (Bengaluru, 2025), Shalyacon (Hyderabad, 2024), Gujarat Ayurveda University, and international forums in Germany, Sweden, Australia, and England. His research focuses on Ayurveda applications in surgery, oral cancer prognosis, diuretic trials comparing modern and Ayurvedic medicines, and water purification methods. He has published widely and authored the book *Ayurveda Shalya Vaidya Upakarana*. Through his academic, clinical, and research excellence, Dr. Karunathilake has significantly advanced Ayurveda and indigenous medicine, earning recognition both nationally and internationally.

ABSTRACT OF THE KEYNOTE ADDRESS – II

Responsibility of the Sri Lankan Ayurveda Institution in Ayurveda Research Studies

Dr. L. P. A. Karunathilake

*Former Additional Director (Postgraduate) and Former Head of the Ayurveda Section,
Institute of Indigenous Medicine, University of Colombo, Sri Lanka*

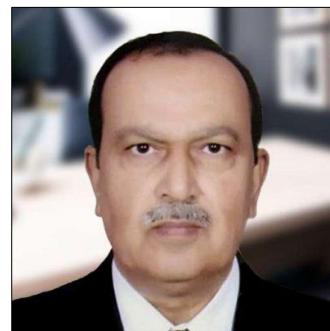
Ayurveda, one of the world's oldest systems of medicine, is deeply rooted in observation, experimentation, and continued refinement. Certain key aspects of Ayurveda should be thoroughly understood before commencing research projects in the medical field. At present, there is an urgent need to identify and focus on priority research areas within Ayurveda. The Sri Lankan Ayurveda medical system holds a vital responsibility to scientifically validate and demonstrate the fundamental principles and authenticity of Ayurveda to the nation. It is essential to conduct well-designed, evidence-based studies that explore traditional beliefs, lifestyle practices, and mental health preservation methods rooted in Ayurveda. Although some collaborative research has been carried out in the past with Western medical professionals, further interdisciplinary studies are needed to strengthen the scientific foundation and global recognition of Ayurveda. This keynote will discuss: 1. Does Ayurveda medical science have knowledge of research fundamentals? 2. Was there research in the Ayurveda medical system since its inception? 3. Has Ayurveda medical science undergone modernization since its origin? Timely need of research studies related Ayurveda will also be discussed. The essential aspects to be considered when commencing Ayurveda related research projects, outline the current gaps, and highlight the areas where Ayurveda can make unique and impactful contributions. The call today is not merely to preserve a tradition, but to advance it through scientific inquiry, ensuring that Ayurveda continues to serve humanity with authenticity, credibility and relevance.

INTRODUCTION TO THE GUEST OF HONOUR

Professor Pradeep Kumar Bharadwaj

Chancellor

*Sparsh Himalaya University, Dehradun, Uttarakhand
India*



It is with great pride and respect that we welcome Prof. (Dr.) Pradeep Kumar Bharadwaj, an eminent academician, administrator, and visionary leader in the field of Ayurveda, as the Guest of Honour for the 2nd International Symposium on Ayurveda, Unani, and Siddha (ISAUS) 2025, organized by the Postgraduate Institute of Indigenous Medicine, University of Colombo.

Prof. Bharadwaj currently serves as the Chancellor of Himalayiyi University, Dehradun, and as Chairman of Himalayiyi Ayurveda, Yoga Evam Prakratik Chikitsa Sansthan, Dehradun. With an illustrious career spanning over three decades, he has held several distinguished positions including Professor of Shalya Tantra (Surgery) at Banaras Hindu University, Director/Dean at Himalayiyi Ayurvedic Medical College & Hospital, Dehradun, Principal & Superintendent at Rishikul Government Postgraduate Ayurvedic College & Hospital, Haridwar, and Dean, Faculty of Ayurveda at H. N. B. Garhwal University, Srinagar. Academically accomplished, Prof. Bharadwaj holds a Ph.D. in Ayurveda from Dr. S.R. Rajasthan Ayurveda University, Jodhpur, an M.D. in Ayurveda from Banaras Hindu University, Varanasi, and a B.A.M.M.S. from Lucknow University, along with a B.Sc. from Meerut University. He brings with him more than 20 years of administrative and research experience, and over 35 years of teaching expertise at undergraduate, postgraduate, and doctoral levels. He has guided more than 30 MD/MS scholars, five postgraduate diploma holders, and four Ph.D. candidates, and has published over 35 research papers in reputed national and international journals. His contributions have been recognized with several honours, including the Saraswat Samaj Seva Samman, Honour of Fellowship by All India Sharir Research Institute, the Vaidya Shiromani Award, and the Ayurveda Martand Award. His deep commitment to Ayurveda education, research, and patient care continues to inspire generations of scholars and practitioners worldwide.

We are honoured to have Prof. (Dr.) Pradeep Kumar Bharadwaj grace ISAUS 2025 as our esteemed Guest of Honour.

ABSTRACT OF THE GUEST OF HONOUR SPEECH

An Overview of Importance of Shalya Tantra, its Heritage and Significance in the Present Era of Quality Research

Professor Pradeep Kumar Bharadwaj

Chancellor, Sparsh Himalaya University, Dehradun, Uttarakhand, India

Distinguished colleagues, respected organizers, and dear participants, it is both an honour and a privilege to join you at this important gathering dedicated to the advancement of Ayurveda and *Shalya Tantra*. Ayurveda, as we all know, is not merely a medical system—it is a timeless science of life that has guided human well-being for thousands of years. Among its eight distinguished branches, *Shalya Tantra*, the surgical discipline, has always held a unique place. From trauma management and wound healing to reconstructive procedures, obstetrics, and innovations such as *Kshara Sutra* and leech therapy, it demonstrates the remarkable depth of knowledge our forebears possessed. History reminds us that during the Vedic period, the Ashwini Kumaras were celebrated for their surgical skills, and later, modern institutions such as BHU pioneered postgraduate training and research that gave *Shalya Tantra* its rightful recognition in society. Today, we proudly acknowledge the contributions of great teachers and researchers whose work has transformed ancient wisdom into practical, evidence-based science. Yet, we must also recognize the pressing need of our time: research in Ayurveda is no longer optional, it is essential. Rigorous, interdisciplinary, and ethically grounded research validates traditional practices, ensures safety and efficacy, and adapts our knowledge to address contemporary challenges such as diabetes, cancer, and lifestyle-related disorders. It is through research that Ayurveda gains global credibility, fosters innovation, and secures its integration into modern healthcare systems. As we look forward, let us remember that our responsibility is twofold: to preserve the profound heritage of Ayurveda and to advance it with scientific rigour for the benefit of future generations. Together, we can ensure that *Shalya Tantra* and Ayurveda continue to serve humanity with wisdom, compassion, and relevance.

LIST OF ABSTRACTS

Review of Ayurveda interventions in the management of menopausal symptoms: A systemic review	
<i>M. K. G. C. M. Manike, H. L. M. G. Sajeewani</i>	660
Successful Ayurveda management of female subfertility with PCOD: A case study	
<i>P. D. P. D. Jayasumana, K. P. K. R. Karunagoda</i>	661
Review of <i>Madhukadi charmalepa</i> on the management of hyperandrogenism features in Polycystic Ovarian Syndrome (PCOS)	
<i>B. S. Samarawickrama, K. P. K. R. Karunagoda</i>	662
Efficacy of <i>Sahachara</i> oil <i>Kati Pichu</i> and <i>Sinhasya Dantee Kashaya</i> for <i>Gridhrasi</i> with evidence based management: A case series	
<i>B. G. M. K. Rajakaruna, N. D. N. Jayawardhane</i>	663
Ethnomedicinal survey on acute wound treatment in the indigenous community in Dambana	
<i>K. H. M. C. D. Herath, B. M. S. Amarajeewa</i>	664
A review of pharmacodynamic and pharmacological potentials of <i>Ksheerabala Taila</i> used in <i>Nanathmaja Vata Vyadi</i>	
<i>D. K. P. P. Dissanayake, R. D. H. Kulathunga</i>	665
From waste to wellness: Validating Unani Medicine's holistic principles through the antimicrobial efficacy of fruit and vegetable discards	
<i>H. A. A. Masha, M. U. Z. N. Farzana</i>	666
Efficacy of Majoon e Gheekawar in the treatment of <i>Waja ul Mafasil Rukbah</i> (knee osteoarthritis): A pilot study	
<i>B. M. Rishad, M. Shiffa, N. Fahamiya</i>	667
Evaluation of the efficacy of Ayurveda formulations in the management of non- alcoholic fatty liver disease: A randomized clinical trial	
<i>K. P. D. C. Perera, R. D. H. Kulatunga</i>	668
A review of the pharmacological and therapeutic potential of <i>Sulugulu Yavaguva</i> in the management of Premenstrual Syndrome (PMS)	
<i>P. S. R. Perera, K. P. K. R. Karunagoda</i>	669
Review of the therapeutic effects of Ayurveda and complementary medicine in colorectal carcinoma	
<i>B. M. S. Amarajeewa, L. D. C. Sandun, D. H. I. S. Weerasinghe</i>	670
Unani therapeutic approach in the management of spongiotic dermatitis: A case report	
<i>M. S. Shihana, M. L. U. Salma</i>	671

Pharmaceutical preparation and analytical standardization of <i>Kungiliya Parpam</i> (KP): A single-herbal Siddha formulation	
<i>V. Shomesh, A. Ketheeswaran, T. Soruban, V. Sathiyaseelan</i>	672
Awareness and associated risk factors of hypertension among adult patients attending National Ayurvedic Teaching Hospital, Borella, Sri Lanka	
<i>S. Anojan, M. U. Z. N. Farzana</i>	673
Ayurveda intervention in autoimmune disorders: A holistic approach to immune modulation and disease management	
<i>D. H. I. S. Weerasinghe, L. D. C. Sandun</i>	674
Management of melasma through Ayurveda: A case study	
<i>S. M. M. W. Kumari, R. L. Y. U. Rathnayake, D. R. K. Elikewala</i>	675
Clinical effect of <i>Matravasti</i> with <i>Granthikadi</i> oil in the management of <i>Pakshaghata</i> (Hemiplegia): Case series	
<i>D. N. D. P. Saparamadu, S. M. S. Samarakoon</i>	676
Efficacy of topical application of paste mentioned in <i>thalpthe pillium</i> for <i>Avasadana</i> <i>Karama</i>: A case study	
<i>H. G. S. G. Wijesiriwardhana, K. K. V. S. Peshala, B. M. S. Amarajeewa, R. N. D. Pathirana, W. A. A. P. Wicramanayake</i>	677
Integrative Ayurveda treatment protocol for <i>Uttana Vatarakta</i>: A clinical case report with symptomatic outcomes	
<i>K. K. A. Nilani, R. D. H. Kulathunga, E. D. T. P. Gunaratna</i>	678
Literature review on medicinal value of <i>Agnimantha</i> in management of obesity (<i>Atisthaulya</i>)	
<i>L. M. S. P. H. De Silva, K. I. W. K. Somarathna</i>	679
Evaluation of effect of <i>Koladi Upanaha Sweda</i> in <i>Janu Sandhigata Vata</i> (knee osteoarthritis)	
<i>M. I. J. Jayakody, R. D. H. Kulatunga, E. D. T. P. Gunaratne</i>	680
Analyzing the efficacy of <i>Amritadya Guggulu</i> and <i>Bhramaree Pranayama</i> on hyperlipidemia	
<i>A. B. Dharmarathna, K. C. Perera</i>	681
Issues and challenges related to Ayurveda Wellness Tourism development in Sri Lanka: Perspective of Ayurveda health professionals	
<i>M. V. S. E. Dharmapala, W. K. A. C. Gnanapala</i>	682
Physicochemical and phytochemical analysis of <i>Majoon e Gheekawar</i> herbal formulation	
<i>B. M. Rishad, M. Shiffa, N. Fahamiya</i>	683

A comparative clinical study on the efficacy of <i>Rasna Panchaka</i> and <i>Rasna Saptaka Kwatha</i> with <i>Murungadi Lepa</i> (local application) in the management of <i>Amavata</i> (Rheumatoid Arthritis)	
<i>A. M. M. Paranagama, S. M. S. Samarakoon</i>	684
<i>Nirgundi Lashunam Shigru Kashaya</i> in the management of <i>Avabahuka</i> (frozen shoulder): A single case study	
<i>R. M. Peiris, S. M. S. Samarakoon</i>	685
Effect of <i>Bilwadi Panchamula</i> along with <i>Suryanamaskara Asana</i> in the secondary prevention of obesity (<i>Athisthaulya</i>)	
<i>B. L. Edirisinghe, W. M. S. S. K. Kulathunga</i>	686
A comparative clinical study on the effect of <i>Guda Haritaki</i> and <i>Amurta Choorna</i> in the management of <i>Panduroga</i> (iron deficiency anemia)	
<i>S. K. P. Waidyarathna, S. M. S. Samarakoon</i>	687
A comparative clinical study on the effect of <i>Agnimantha Shilajit Yoga</i> and <i>Bilvadi Yoga</i> in the management of <i>Stihaulya</i> w.s.r. to overweight and obesity	
<i>K. K. I. Eranga, K. G. C. Dissanayake</i>	688
Efficacy of Ayurveda management on <i>Vatala Yoni Vyapad</i> w.s.r. endometriosis: A single case study	
<i>U. P. P. Wijethunge, K. P. K. R. Karunagoda, Y. A. U. D. Karunarathne</i>	689

Review of Ayurveda interventions in the management of menopausal symptoms: A systemic review

M. K. G. C. M. Manike¹, H. L. M. G. Sajeewani²

¹*Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka*

²*Bandaranayake Memorial Ayurveda Research Institute (BMARI), Sri Lanka*

Menopause, defined as the permanent cessation of menstruation, is a universal physiological transition in women that typically occurs between the ages of 45 and 55. In Ayurveda, the concept of Rajonivrittijanya Lakshana corresponds to menopausal symptoms. A comprehensive literature search initially identified 117 articles across multiple databases (PubMed, ResearchGate, DHARA, CCRAS). After removing duplicates, 90 articles remained for title and abstract screening. Of these, 78 were excluded as they were not randomized controlled trials (RCTs) or did not evaluate Ayurveda-based interventions. Twelve RCTs met the inclusion criteria, investigating a variety of Ayurvedic herbs and formulations. Women aged 40–60 years participated in these clinical studies. Shatavari emerged as the most commonly used herbal intervention, while Shirodhara and Nasya were employed as external Panchakarma therapies. The results demonstrated significant improvements in somatic symptoms (e.g., hot flashes, night sweats, sleep disturbances) and psychological symptoms (e.g., anxiety, depression, mood swings) compared to conventional treatments. Additionally, improvements in hormonal balance and overall quality of life were observed, with minimal adverse effects. This systematic review supports the efficacy and safety of Ayurveda interventions in managing menopausal symptoms. Further research is warranted to optimize treatment protocols and clarify mechanisms of action.

Keywords: *Menopausal symptoms, Shathawari, Shirodhara, Nasya*

Successful Ayurveda management of female subfertility with PCOD: A case study

P. D. P. D. Jayasumana¹, K. P. K. R. Karunagoda²

¹Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka

²Department of Prasuthithantra Kaumarabhrithya, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka

This case study reports the successful Ayurveda management of subfertility in a 26-year-old G2P0C0 female with a six-year history of irregular menstruation and five years of unsuccessful conception despite allopathy treatment. The patient had two complete miscarriages, at 8 weeks in 2018 and at 11 weeks in 2021, and had never used contraceptives. Menstrual history included menarche at 15 years, normal volume and colour, absence of clots or odour, but intermittent spotting and scanty bleeding during the first two days of menstruation, accompanied by moderate lower abdominal pain in the preceding year. She presented with clinical features of PCOD with low follicular maturity, confirmed by D12-TVS on 04th December 2023. Hysterosalpingography in January 2024 showed normal tubal patency, and her husband's semen analysis was normal, ruling out male factor infertility. An individualized Ayurveda treatment protocol was implemented over eight weeks in three phases. The initial two-week outpatient phase focused on *Ama pachana* and *Agni deepana* using *Pranadajamoda* decoction, *Chandraprabhavati*, *Avipaththikara choorna*, and *Manibadra choorna*. The subsequent four-week inpatient phase included internal medications such as *Punarnavashtaka* decoction, *Kanchanara Guggulu*, *Gokshura Guggulu*, *Arogyawardhani Vati*, *Hingvashtaka choorna*, *Guduchi choorna*, and *Dhatri choorna*. Local therapies comprised *Nadi Sweda* with *Sarshapadi* oil and *Nikadi pottani*, *Yoga Vasti* (8 days of *Anuvasana* with *Nirgundyadi* oil and *Niruha Vasti* with *Kaluduru-Shatapushpa* decoction), and abdominal applications of *Dashanga Lepa*. Further Panchakarma procedures included *Shirodhara*, *Nasya* (*Nirgundyadi* oil and *Nuga Karati*), and *Yoni Sheka* with *Panchavalkala* decoction and lastly *Tharpana* treatment with *Shathavari gopakanya* decoction and *Pushpadhanwa rasa* for 2 weeks. Following the treatment, the patient conceived naturally in September 2024 reported with matured follicles and delivered a healthy infant via normal vaginal delivery in June 2025. No adverse drug reactions were reported. This case illustrates the potential of comprehensive, individualized Ayurveda interventions in enhancing reproductive health through systemic detoxification, hormonal regulation, and reproductive tissue rejuvenation in female subfertility with PCOD.

Keywords: Subfertility, Ayurveda management, PCOD, Case study

Review of *Madhukadi charmalepa* on the management of hyperandrogenism features in Polycystic Ovarian Syndrome (PCOS)

B. S. Samarawickrama¹, K. P. K. R. Karunagoda²

¹Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka

²Department of Prasuthithantra Kaumarabhrithya, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka

Polycystic ovarian syndrome (PCOS) is a metabolic, reproductive, and psychological disorder affecting 6–20% of reproductive-age women worldwide. Hirsutism, Acne, and Acanthosis nigricans are common hyperandrogenism features of PCOS that mainly affect the mental status in young women. In Ayurveda, we can correlate it with *Arthawaksya* according to *Charakacharya* and *Pushpagani Jathaharani* according to *Haritha Samhitha*. This comprehensive review analyses the pharmacological properties of the ingredient of *Madhukadi Charmalepa*, a traditional Ayurvedic formulation used at the National Ayurveda Hospital, Borella, in hyperandrogenic features of PCOS. *Nelumbo nucifera*, *Terminalia chebula*, *Santalum album*, *Coscinium fenestratum*, *Glycyrrhiza glabra*, *Curcuma zedoaria* and bee honey are components of *Madhukadi charmalepa*. This comprehensive study was conducted, and relevant literature was sourced from PubMed, Google Scholar, and Ayurvedic classical texts, with inclusion criteria focusing on research from 2015 to June 2025. The ingredients exhibit potent pharmacological properties such as anti-inflammatory, antioxidant, anti-acne, anti-androgenic, and skin rejuvenating effects. Specific actions like the estrogenic and androgen-suppressing properties, wound healing, collagen-enhancing effect, and antimicrobial activity contribute to alleviating PCOS related dermatological symptoms. Ayurvedic attributes such as *Tridoshaghna*, *Kusthaghna*, *Varnya*, and *Rasayana* further support the formulation's efficacy in reducing hyperandrogenism symptoms. According to the findings of the review, the ingredient of the *Madukadi Charmalepa* contains the potential ability to act against the hyperandrogenic facial features in PCOS cases. A clinical study is suggested to prove its significant action scientifically.

Keywords: *Madukadi charmalepa*, *Pharmacological properties*, *PCOS*, *Hyperandrogenism*, *Ayurveda properties*

Efficacy of *Sahachara* oil *Kati Pichu* and *Sinhasya Dantee Kashaya* for *Gridhrasi* with evidence based management: A case series

B. G. M. K. Rajakaruna¹, N. D. N. Jayawardhane²

¹Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka

²Department of Ayurveda Medicine and Indigenous Medicine, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka

Among the eighty types of *Vata Vyadhi* mentioned in Ayurveda authentics, *Gridhrasi* is a pain-predominant and widely prevalent health problem, affecting more than 75% of the world's population. It is a hindrance to the day-to-day life of the working population. The word “*Gridhrasi*” suggests the abnormal gait of a patient, similar to that of the vulture due to the effect of the *Gridhrasi Nadi*. Signs and symptoms of *Gridhrasi* closely resembles the symptoms of sciatica which is described in Allopathic Medicine. Most of the conventional systems of medicines have short term pain relief treatments or surgical interventions which have more after effects and are costly. Ayurveda has various treatment modalities for the *Gridhrasi* disease based on a holistic approach. Among them *Vata shamana* or *Vata* pacification treatment has focused on the normalization of *Gati* and *Gundhana Kriya* which help to reduce the pain as well as the abnormal gait of the patient. The present study was conducted to evaluate the efficacy of a specific Ayurveda treatment protocol for five *Gridhrasi* patients. In this study *Sinhasya danthi* decoction was given internally and *Sahachara* oil applied externally as *pichu* for two weeks. Assessment was done before starting the treatment, after 7th day of treatment and at the end (after 14 days) of the treatment. Straight Leg Raising Test (SLRT), Movements of lumbar sacral region and Visual Analog Scale (VAS) of pain were used as assessment criteria. Lumbar sacral X-ray was taken for diagnosis purpose. At the end of the treatment reduced clinical features could be observed, such as increased SLRT angle, improved movements of lumba sacral region, decreased VAS scale of pain and increased quality of life. The results indicate a positive pathway for future treatment strategies for *Gridhrasi*.

Keywords: *Sinhasya dantee decoction, Sahachara oil, Gridhrasi, Kati Pichu, Vata Shamana*

Ethnomedicinal survey on acute wound treatment in the indigenous community in Dambana

K. H. M. C. D. Herath¹, B. M. S. Amarajeewa²

¹*Leafy Ayuur Ayurveda Medical Center, Kesbewa. Sri Lanka*

²*Department of Ayurveda Surgery, ENT, Ophthalmology and Gynecology, Obstetrics and Pediatrics, Faculty of Indigenous Medicine, University of Colombo. Sri Lanka*

Sri Lanka possesses a unique indigenous medical system known as *Deshiya Vedakama*, rooted in centuries-old traditions passed down through generations. Within this context, the Dambana indigenous community stands out for its distinctive ethnomedicinal practices, especially in the treatment of acute wounds. This study explores the traditional wound healing methods practiced by the Veddhas of Dambana, aiming to identify medicinal plants used and evaluate the uniqueness of their healing system. Data were collected through structured interviews with indigenous practitioners in Dambana and its suburbs. Approximately thirty plant species were documented, each identified by their Sinhala and scientific names, and categorized according to their healing properties— *Vranashodhana* (wound cleaning), *Vranaropana* (wound healing), and hemostatic (bleeding control) actions. Notably, three plants— Gadabo (*Tridax procumbens*), Kaheyyan (species unidentified), and Gongotu (*Streblus asper*)—were found to be exclusive to the Dambana community's medical repertoire, not widely used in mainstream Ayurveda. The findings reveal that the Dambana healing system is deeply tied to nature and cultural heritage. It is transmitted orally within the community and guarded with strict confidentiality, often resistant to external inquiry. However, due to environmental degradation, modernization, and diminishing interest among younger generations, this invaluable knowledge faces the risk of disappearance. The study underscores the importance of recognizing, documenting, and protecting such indigenous knowledge systems. Further pharmacological research into the unique plant species identified may provide insights for integrative wound healing therapies. Building trust and preserving the lifestyle and environment of the Dambana native community are vital to safeguarding their medicinal legacy.

Keywords: *Ethnomedicine, Acute wound, Dambana native community, Traditional medicine, Medicinal plants*

A review of pharmacodynamic and pharmacological potentials of *Ksheerabala Taila* used in *Nanathmaja Vata Vyadi*

D. K. P. P. Dissanayake¹, R. D. H. Kulathunga²

¹Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka

²Department of Ayurveda Medicine and Indigenous Medicine, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka

Ksheerabala Taila (KbT) is one of the most widely used formulations in the management of *Vata Vyadhi*, including *Pakshagata*, *Gridhrasi*, *Sandhigata Vata*, *Kampa Vata*, and *Ardita*. It is administered in various therapeutic modalities such as *Snehana*, *Shiro Pichu*, *Shirodhara*, *Matra Vasti*, *Shiro Vasti*, and *Nasya*. The preparation methods and therapeutic indications are described in the *Sahasrayogam Thaila Prakaranaya*. It is prepared by processing *Bala* (*Sida cordifolia*), cow's milk (*Ksheera*) and sesame oil (*Tila Taila*). This review aims to explore its pharmacodynamic and pharmacological potentials based on classical knowledge. A literature survey was conducted using Ayurvedic texts such as *Sahasrayogam*, *Charaka Samhita*, *Sushruta Samhita*, *Bhavaprakasha* and modern databases such as ResearchGate, Google Scholar. *Bala* has *Vedanastapana* and *Shothahara* properties. *Tila Taila* possesses *Snehana*, *Vedanastapana*, *Sandhaniya*, *Vrana Shodana*, *Vrana Ropana* and *Keshya* properties. Cow's milk exhibits *Snehana*, *Sandhaniya*, *Ropana* and *Bala wardhana* qualities. KbT predominantly exhibits *Madhura Rasa* (100 %), *Guru* and *Snigdha Guna* (33.3 %), *Picchila guna* (22.2 %), *Shita Virya* (66.6 %), *Ushna Virya* (33.3 %), *Madhura Vipaka* (100 %) properties. These combined qualities contribute to its *Vata* pacifying action and the combination of these three ingredients makes KbT to pacify all eighty *Nanathmaja Vata Vyadhi*. Pharmacologically, *Bala* shows analgesic, anti-inflammatory, and neuro protective effects. *Tila Taila* contains antioxidants and essential fatty acids aiding tissue repair. *Ksheera* provides proteins, calcium, and growth factors. Further scientific evaluation and clinical trials are needed to validate its efficacy, standardize its preparation, and ensure its safety in therapeutic practice.

Keywords: *Ksheerabala Taila*, *Vata Vyadhi*, *Ayurveda*, *Pharmacodynamic*, *Pharmacological potential*

From waste to wellness: Validating Unani Medicine's holistic principles through the antimicrobial efficacy of fruit and vegetable discards

H. A. A. Masha, M. U. Z. N. Farzana

*Department of Unani Clinical Medicine, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka*

Unani medicine is founded on the principle of holistic and efficient utilization of natural resources such as vegetables and fruits. Despite this historical wisdom, a systematic synthesis of modern scientific evidence validating the antimicrobial properties of these specific wastes in the context of Unani principles is lacking. This review aims to bridge that gap by exploring the antimicrobial potential of commonly discarded plant parts and correlating these findings with Unani medical system, thereby providing a scientific foundation for a traditional holistic approach. A systematic comprehensive review was conducted following PRISMA guidelines. Electronic databases (PubMed, Science Direct, Google Scholar) were searched for peer-reviewed articles published between 2012 and 2024 using keywords including "vegetable and fruit waste," "antimicrobial activity," "Unani medicine," and specific plant names. After screening, a total of 28 articles met the inclusion criteria, which encompassed studies on the phytochemical and pharmacological properties of plant waste parts. Data regarding extraction methods, phytochemicals, antimicrobial efficacy, and mechanisms of action were extracted and synthesized. The review conclusively demonstrated that discarded plant parts (e.g. potato (*Aaloo*), mango (*Aam*) peel, banana (*kela*) peel, bottle gourd (*kaddu*) peel, cauliflower (*Phool hobi*) stem) are rich sources of potent antimicrobial bioactive compounds, including polyphenols, flavonoids, alkaloids, and tannins. These compounds exhibited broad-spectrum activity against key food-borne pathogens (*Staphylococcus aureus*, *Escherichia coli*, *Salmonella typhi*, *Candida spp.*) through mechanisms such as cell wall damage, inhibition of protein synthesis, and disruption of microbial membranes. Crucially, these scientific findings show a strong correlation with Unani therapeutic concepts. The anti-putrefactive and astringent (*Daf-e-Ta'affun*, *Qabiz*) properties align with treating infectious diarrhoea and gastrointestinal infections. The ulcer-repellent and skin-strengthening (*Daf-e-Quruh*, *Muqawwi-e-Jild*) effects validate their use for topical applications against boils and wounds. This synthesis validates Unani medicine by showing that plant wastes possess strong antimicrobial properties, aligning with principles like *Taqliyyul Akhlat* (purification of humors). Integrating traditional wisdom with modern science offers a sustainable approach to develop eco-friendly nutraceuticals and functional foods, turning waste into wellness. Future studies should standardize extracts and conduct *in vivo* trials for practical application.

Keywords: *Vegetable and fruit waste, Antimicrobial activity, Unani medicine, Bioactive compounds*

Efficacy of Majoon e Gheekawar in the treatment of *Waja ul Mafasil Rukbah* (knee osteoarthritis): A pilot study

B. M. Rishad¹, M. Shiffa², N. Fahamiya³

¹*Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka*

²*Department of Unani Clinical Medicine, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

³*Department of Unani Pharmacology, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

Waja ul Mafasil Rukbah, a term for knee osteoarthritis (KOA) in Unani medicine, is a leading cause of mobility limitation among the elderly. According to Unani principles, KOA pathology stems from an imbalance of humoral temperament and the accumulation of morbid matter in the joints. The primary goal of treatment is to restore balance and eliminate these morbid materials. This study investigates the effectiveness of Majoon e Gheekawar, a traditional Unani compound formulation, for treating KOA. The formulation consists of Maghz-e-Gheekawar (pulp of *Aloe vera*), Sheer-e-Gao (cow's milk), and Qand Safaid (sugar). In this pilot study, six patients with KOA were administered 5 g of Majoon e Gheekawar orally twice daily for four weeks. The primary outcomes—pain, function, and mobility were assessed using the Knee injury and Osteoarthritis Outcome Score (KOOS), Visual Analogue Scale (VAS), active and passive range of motion, and the 10-meter walking test. Paired t-tests were used to compare pre- and post-treatment data. Significant improvements were observed across all outcome measures. The mean KOOS pain score decreased from 29.0 ± 2.76 to 13.17 ± 2.14 ($p < 0.001$), and the total KOOS score improved from 138.0 ± 7.8 to 64.0 ± 8.10 ($p < 0.001$). Significant improvements were also found in VAS scores, active and passive range of motion, and walking time when compared to pre-treatment data. This study demonstrates that oral administration of Majoon e Gheekawar significantly relieves the symptoms of knee osteoarthritis. These promising results provide a strong basis for further research into this traditional Unani formulation as a potential treatment for KOA.

Keywords: *Knee osteoarthritis, KOOS, Majoon e Gheekawar, Waja ul Mafasil Rukbah*

Evaluation of the efficacy of Ayurveda formulations in the management of non-alcoholic fatty liver disease: A randomized clinical trial

K. P. D. C. Perera¹, R. D. H. Kulatunga²

¹Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka

²Department of Ayurveda Medicine and Indigenous Medicine, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka

Non-alcoholic fatty liver disease (NAFLD) is a common hepatic disorder, often linked to obesity and metabolic syndrome, ranging from simple steatosis to nonalcoholic steatohepatitis (NASH), which can progress to cirrhosis and hepatocellular carcinoma. The study was focused on evaluating the efficacy of two Ayurveda formulations, *Phalatrikadi Kvatha* combined with either *Triphala Guggulu* or *Arogyavardhana Vati* for NAFLD management. Seventy-two patients were recruited to the study. They were randomly assigned to Group A (*Phalatrikadi Kvatha* with *Triphala Guggulu*) or Group B (*Phalatrikadi Kvatha* with *Arogyavardhana Vati*). Evaluations included clinical histories, anthropometric measurements, hematological, biochemical and ultrasound imaging. The cohort was predominantly aged 61-70 years (53.1%) and female, with the majority diagnosed with Grade II fatty liver (65.6%). Abdominal discomfort was the most frequent symptom (46.9%). Post-treatment, both groups showed significant symptom relief. Group A had a mean BMI reduction of 0.69 ± 0.39 , while Group B showed a reduction of 0.53 ± 0.36 ($p > 0.05$). Liver function tests revealed a decrease in AST/SGOT levels for Group A (9.54 ± 3.46) and Group B (9.61 ± 4.08), though the difference was not significant ($p > 0.05$). However, ALT/SGPT levels showed a substantial reduction in Group B (37.60 ± 14.83) compared to Group A (11.36 ± 7.71) ($p < 0.05$). Additional improvements were seen in GGT, ALP, serum albumin, and bilirubin levels, though these changes were not statistically significant ($p > 0.05$). Serum creatinine levels showed mild reduction, with ultrasound imaging showing no significant change in liver echogenicity and parenchymal thickness. Both Ayurveda treatments were effective, with Group B demonstrating superior improvements in liver function, especially in ALT/SGPT levels, supporting the efficacy of these interventions for managing NAFLD.

Keywords: NAFLD, Ayurveda, *Phalatrikadi Kvatha*, *Triphala Guggulu*, *Arogyavardhana Vati*

A review of the pharmacological and therapeutic potential of *Sulugulu Yavaguva* in the management of Premenstrual Syndrome (PMS)

P. S. R. Perera¹, K. P. K. R. Karunagoda²

¹*Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka*

²*Department of Prasuthithantra Kaumarabhrithya, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

Premenstrual syndrome (PMS) is a condition which occurs during luteal phase of the menstrual cycle in a cyclic manner, which is experienced by 47.8% of women in reproductive age. The traditional gruel preparation named Sulugulu yaguva contained 11 spices which are being tested for the efficacy on PMS by a clinical trial. This research aimed to study if its pharmacological and medicinal values could be effective in controlling PMS. The pharmacological properties and medicinal properties of the ingredients of the selected formula were collected from peer reviewed and science citation indexed articles published between 2015 to 2025. Certain studies claimed the efficacy of some of the ingredients of the study formulae. *Zingiber officinalae*, *Curcuma longa*, *Foeniculum vulgare* showed oxidative stress reduction, reduced anxiety and depression, improved physical and mental behaviour in PMS. Anti-inflammatory, anti-oxidant and immunomodulatory properties of other ingredients also may be beneficial for managing PMS. Further, studies on Ayurveda aspect showed the action of these herbs on *Samprapthi Vighatana* of PMS. Vatanulomana property of *Carun carvi*, *Asafetida ferula*, *Trachyspermum ammi* would provide significant support to control PMS related symptoms. Considering the vitiation of doshas, Sulugulu yavagu possesses Vata and Pitta Shamana actions, which may help restore the balance in *Ritu vathita kala*. Moreover *Shulahara*, *Garbhasha Shotahara* properties of *Carun carvi*; *Rakta shodana* action of *Curcuma longa*, and *Deepana*, *Amapachana* effects of fenugreek also may play important roles. With this study it was proved that the medicinal and pharmacological properties of the ingredients of Sulugulu yavagu had the potential ability to control PMS related symptoms. After analyzing the data of the clinical trials conducted using this formula the efficacy may be proven scientifically.

Keywords: *Sulugulu yaguva, Pharmacological and therapeutic effects, Premenstrual Syndrome*

Review of the therapeutic effects of Ayurveda and complementary medicine in colorectal carcinoma

B. M. S. Amarajeewa¹, L. D. C. Sandun², D. H. I. S. Weerasinghe³

¹*Department of Ayurveda Surgery, ENT, Ophthalmology and Gynecology, Obstetrics and Pediatrics, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

²*Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka*

³*Institute of Biochemistry, Molecular Biology and Biotechnology, University of Colombo, Sri Lanka*

Colorectal carcinoma (CRC) is the third most common type of cancer and the second leading cause of cancer-related deaths globally. Disparities in CRC epidemiology exist among populations, likely due to variations in exposure to lifestyle and environmental factors associated with CRC. Primary prevention involves identifying and mitigating modifiable risk factors, such as alcohol consumption, tobacco use, and unhealthy dietary components, while concurrently promoting protective factors like physical activity. CRC is a condition that exclusively affects the colon or rectum, resulting from the abnormal proliferation of glandular epithelial cells within the colon. There are three main types of colorectal cancer: sporadic, hereditary, and colitis-associated. Approximately 20% of CRC cases are linked to genetic factors, with research indicating a threefold increased risk of cancer among first-degree relatives of CRC patients. The main objective was to review the therapeutic effects of Ayurveda and complementary medicine on CRC. A comprehensive review of studies from January 2005 to August 2025 was conducted on PubMed, Scopus, and Web of Science. Combining Ayurveda with systems like TCM and Korean medicine may offer additional treatment options. Evidence suggests that these methods can influence gene expression, signaling pathways, and immune function and reduce treatment side effects. Herbal remedies and traditional therapies may alleviate symptoms, improve quality of life, and sometimes cause tumor regression when combined with conventional treatments. Ayurvedic therapies, including Rasayana and herbs like *Catharanthus roseus*, show potential for long-term management and recovery. However, most research is anecdotal; rigorous clinical trials are needed to confirm safety and effectiveness. Future studies should integrate traditional and modern medicine for a comprehensive approach to CRC treatment.

Keywords: *Colorectal carcinoma, Arbuda, Ayurveda, Complementary medicine, Herbal therapy*

Unani therapeutic approach in the management of spongiotic dermatitis: A case report

M. S. Shihana¹, M. L. U. Salma²

¹*Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka*

²*Department of Unani Clinical Medicine, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka*

Spongiosis refers to the accumulation of edema fluid in the keratinocytes which in some cases may progress to the formation of cysts or bullae. The type of spongiotic reaction is characterized by changes in the epidermis associated with accumulation of intracellular edema. Unani medicine has enormous potential in treating chronic and recurring skin conditions like *Nare Farsi* (Eczema). According to Unani medicine, *Nare farsi* results from excessive production of abnormal *saфра* mixed with abnormal *sauda or saudae muhtarika*. The aim of this case study is to evaluate the effect of combined Unani formulations in the management of spongiotic dermatitis. A 69-year-old patient presented at the OPD of the NAHSL with a three-year history of recurrent fluid-filled lesions on the hands and feet. Clinical examination revealed bullae and erosion of stone flakes on plantar surfaces of hand and foot. Microscopic finding showed a hyperkeratotic epidermis and focal intraepidermal bulla lesions containing polymorphs and scattered lymphocytes. The papillary tissue and superficial dermis showed capillaries surrounded by lymphocytes and polymorphs. Patient was treated with *Majoone Dabeedul vard*, *Ithripale Shahathra*, and *Habbe Musaffie khoon* internally. *Roghane Khas* was applied externally. Outcome was assessed using both subjective and objective parameters. Significant improvement in the fluid-filled lesions, with a marked reduction in vesicles and bullae on the hands and feet were observed. Liver function test showed stabilization of previously elevated AST and ALT levels. This case highlights the value of Unani formulation in the management of spongiotic dermatitis and further clinical studies are required to validate these findings.

Keywords: *Spongiotic dermatitis, Nare Farsi, Majoone Dabeedul Vard, Liver function test*

Pharmaceutical preparation and analytical standardization of *Kungiliya Parpam* (KP): A single-herbal Siddha formulation

V. Shomesh¹, A. Ketheeswaran², T. Soruban³, V. Sathiyaseelan⁴

¹*Department of Ayurveda, Western Province, Sri Lanka*

²*Siddha District Hospital, Jaffna, Sri Lanka*

³*Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka*

⁴*Department of Gunapadam, Faculty of Siddha Medicine, University of Jaffna, Sri Lanka*

The Siddha system of medicine, one of the oldest traditional healing practices in Sri Lanka and India, emphasizes the use of herbal, mineral, and animal-derived preparations for therapeutic purposes. *Kungiliya Parpam* (KP), a single-herbal formulation derived from the resin *Kungiliyam* (*Shorea robusta*), is traditionally used to treat conditions like leucorrhoea (*Vellei*), painful micturition (*Neererivu*), and dysentery (*Seethabedhi*). This study aimed to standardize the preparation and evaluate the physicochemical, organoleptic, morphological, and elemental properties of KP according to Pharmacopeial Laboratory for Indian Medicine (PLIM) guidelines. The drug was prepared using tender coconut water and underwent several cycles of purification and calcination before being powdered. Organoleptic evaluation showed KP to be whitish in colour, odourless, soft in texture, and non-free flowing. Siddha-specific tests confirmed its fineness, absence of taste, buoyancy on water, and lack of luster, indicating purity and adherence to traditional quality markers. SEM analysis revealed uniformly fine particles with sizes ranging from 5 to 10 µm, consistent with expected *Parpam* texture. Physicochemical parameters including pH (8.1), low moisture content (0.23%), high total ash (91.54%), and absence of acid-insoluble ash further confirmed purity and shelf stability. ICP-OES analysis showed the absence of toxic heavy metals such as arsenic, mercury, cadmium, and lead, and detected therapeutically relevant trace elements like calcium, potassium, iron, and zinc. The study validates KP as a safe, standardized Siddha preparation with potential therapeutic applications, supporting its integration into contemporary herbal practice.

Keywords: *Kungiliya Parpam, Shorea robusta, Siddha medicine, Single-herbal formulation, Standardization*

Awareness and associated risk factors of hypertension among adult patients attending National Ayurvedic Teaching Hospital, Borella, Sri Lanka

S. Anojan, M. U. Z. N. Farzana

*Department of Unani Clinical Medicine, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka*

Hypertension is a major public health problem that affects approximately 26% of adult population worldwide. It is a significant risk factor for cardiovascular diseases, stroke and renal failure, and causes about 7.1 million deaths per year worldwide. The prevalence of hypertension is suggested to be increasing worldwide, particularly in developing countries due to nutritional transition and westernization. Moreover, lack of awareness regarding the disease status increases incidence of complications and mortality. Although modifiable through lifestyle interventions and medical management, hypertension accounts for approximately 32% of stroke cases in Sri Lanka. The study aimed to determine the awareness of hypertension status and risk factors among adult patients attending the National Ayurveda Hospital, Borella. After receiving ethical clearance from Faculty of Indigenous Medicine this hospital-based cross-sectional design study was conducted between December 2023 and January 2024. A field-tested, structured questionnaire was used to collect information on demographics, awareness and risk factors for hypertension. Descriptive statistics was used to calculate percentage of participants who were classified to be aware of their hypertension status, with the total hypertensive participants as the denominator. Percentage calculation was used to test the association between significant variables and hypertension. Of the 159 (53%) participants who were hypertensive, 73 (46.2%) were not aware of their hypertension status. Age over 40 years, marital status, smoking, BMI were independent predictors of hypertension. However, increasing level of education was inversely related to hypertension. In conclusion, the high proportion of individuals unaware of their hypertension status could lead to delay in treatment initiation which ultimately increases complications arising from the disease. All the identified risk factors except age are modifiable through lifestyle change interventions. Therefore, there is a need for the health care workers to hold regular health education programmes to increase awareness of hypertension status and promote healthy lifestyle.

Keywords: *Hypertension, Lifestyle, Risk factors, Smoking*

Ayurveda intervention in autoimmune disorders: A holistic approach to immune modulation and disease management

D. H. I. S. Weerasinghe¹, L. D. C. Sandun²

¹*Institute of Biochemistry, Molecular Biology and Biotechnology,
University of Colombo, Sri Lanka*

²*Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka*

Autoimmune disorders depict a root global health challenge, characterized by an abnormal immune response that attacks the body's own tissues, resulting from chronic inflammation and damage. Allopathic treatments primarily use immunosuppressive drugs that relieve symptoms but often cause serious side effects and seldom target the underlying cause of immune imbalance. In this context, Ayurveda—the traditional medical system of India—plays an important role in a holistic approach to understanding and managing autoimmune illnesses through personalized, multiple strategies and therapies. This study focuses on Ayurvedic strategies and approaches for autoimmune disorders, depicting how basic concepts such as Ama (toxins), Agni (digestive fire), Dosha imbalance, and Vyadhikshamatva (immune resistance) are combined into novel immunology. Also, Ayurvedic treatment procedures such as herbal formulations, Panchakarma detoxification, rejuvenation methodologies, and diet and lifestyle modifications, uplift the potential to elevate immunological health, reduce inflammation, and boost overall balance. Herbs such as Ashwagandha (*Withania somnifera*), Guduchi (*Tinospora cordifolia*), Turmeric (*Curcuma longa*), and Guggulu (*Commiphora mukul*) are specified for their distinct roles in enriching immunity, contributing to antioxidant properties, and curtailing inflammation. Evolving evidence from clinical trials and preliminary studies suggests these herbs can influence the body's cytokine levels, regulate T-cell responses, and support a healthy gut microbiome—main factors in the enhancement of autoimmune diseases. The review emphasizes the hardships in standardizing Ayurvedic treatments and points out the need for scientific validation. It researches the possibility of expanding integrative methodologies that merge Ayurvedic knowledge with novel medicinal knowledge. By bridging Ayurveda and immunology, it facilitates a step toward holistic, patient-oriented care for autoimmune diseases, stressing prevention, personalized strategies, and long-term health to build stability.

Keywords: *Autoimmune disorders, Ayurveda, Herbs, Integrated medicines*

Management of melasma through Ayurveda: A case study

S. M. M. W. Kumari¹, R. L. Y. U. Rathnayake², D. R. K. Elikewala¹

¹*Department of Ayurveda Medicine and Indigenous Medicine, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

²*Department of Ayurveda Surgery, ENT, Ophthalmology and Gynecology, Obstetrics and Pediatrics, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

Melasma or *Vyanga* is a skin condition characterized by the presence of hyper pigmented patches on the face and back area. In Ayurveda, this skin disease known as *Vyanga* is categorized under "*Kshudra Rogas*" due to vitiation of *Pitta*, *Vata* and *Rakta Dosha*. The study was conducted to find out the effectiveness of Ayurveda management in *Vyanga*. The major signs and symptoms were blackish pigmentation without pain and itching on face and back area. A 16-year old male patient having blackish pigmentation without pain and itching on face and back area for the past 4 months presented at the OPD, Ayurveda Hospital Palkelele, Sri Lanka was enrolled in the study. The patient had no other complaints and no related family history. He has taken allopathic treatment and then he got registered in the present study for further management. The consent was taken and signs and symptoms were recorded. The investigations were done and data were collected based on available clinical facilities. The treatment regimen includes internal medicines like *Nawakarshaka Kashaya*, *Manibadhra Choorna*, *Kaishoora Guggulu* followed by the *Lodhradi Lepa* and *Raktha Chandanadhi Lepa* with *Pinda* oil application and *Pancha Walkala Pariseka Sweda* on the face and back area externally for 28 days. *Vata-Pitta-Rakta* pacifying treatment protocol was planned according to the principles of the management. Reduction of the signs and symptoms were assessed using Melasma Area Severity Index (MASI) and Melasma Quality of Life Scale (MELASQOL). The patient had relief in most of the signs and symptoms after 28 days of treatment. Excellent improvement was observed in Melasma Area Severity Index (MASI) from grade 3 to 1 and also Melasma Quality of Life Scale from grade 7 to 1. All therapies like *Pariseka Sweda*, *Lepa* as a combined treatment, pacify the vitiated *Vata Pitta-Rakta Dosha* in the body and thus provide glow to the skin. The drugs used orally have an additional effect in relieving all signs and symptoms of the disease. This case study demonstrates the effectiveness of Ayurveda in the management of *Vyanga*. The clinical trial should be planned in the future with a larger sample size to generalize the findings.

Keywords: *Melasma, Vyanga, Lepa, Pariseka Sweda*

Clinical effect of *Matravasti* with *Granthikadi* oil in the management of *Pakshaghata* (Hemiplegia): Case series

D. N. D. P. Saparamadu, S. M. S. Samarakoon

Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka

Pakshaghata, or hemiplegia, is the commonest manifestation of a stroke with a neurological deficit affecting the face, limbs, and trunk on one side or either side of the body which greatly impacts the quality of life of the patient. The study has been focused on managing the *Pakshaghata* based on the treatment principles mentioned in Ayurveda. Fifty to seventy year-old male and female patients of *Pakshaghata* presented with weakness, numbness, and heaviness in the right or left upper and lower limbs reported to the I.P.D., Department of *Kayachikitsa*, National Ayurveda Hospital, Borella. Patients were treated with *Snehana*, *Swedana* followed by *Matravasti* for 21 days combined with *Granthikadi* oil *Abhyanga*. The assessment was made according to the National Institute of Health Stroke Scale (NIH-SS); visual field, facial palsy, motor arm, motor leg, limb ataxia, sensory functions, dysarthria and extinction. Overall, NIH-SS decreased. Case 01, moderate stroke reduced to minor, case 02 moderate reduced to minor, case 03 minor stroke reduced to no stroke, case 04 moderate stroke reduced to minor stroke, case 05 moderate stroke reduced to minor. Sensory and motor functions were improved significantly which led to the conclusion that *Matravasti* with *Granthikadi* oil is effective on *Pakshaghata*.

Keywords: *Pakshaghata*, *Hemiplegia*, *Matravasti*, *Granthikadi* oil

Efficacy of topical application of paste mentioned in thalpathe pillium for *Avasadana Karma*: A case study

H. G. S. G. Wijesiriwardhana¹, K. K. V. S. Peshala², B. M. S. Amarajeewa²,
R. N. D. Pathirana¹, W. A. A. P. Wicramanayake³

¹Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka

²Department of Ayurveda Surgery, ENT, Ophthalmology and Gynecology, Obstetrics and Pediatrics,
Faculty of Indigenous Medicine, University of Colombo, Sri Lanka

³Pallekele Provincial Ayurveda Hospital, Sri Lanka

Non-healing ulcers are defined as ulcers that persist despite appropriate treatment and do not proceed towards healing in a defined time period. Wound healing is a very dynamic and complex process. It is divided into 5 stages in which granulation tissue formation, angiogenesis and synthesis of collagen occurs in the proliferative phase. On the basis of clinical features, chronic non-healing ulcers can be considered as *Dushtavrana* in Ayurveda. Different types of *Vrana* and sixty types of treatment modalities are well explained in Susrutha Samhitha. *Avasadana Karma* is indicated in non-healing ulcers with hypergranulation tissues/wounds raised beyond the skin level. It is the procedure for reducing the overgrowth of tissue located at the wound base using drugs that promote necrotization or scraping of hypergranulated tissues. Thalpathe piliyam which is a collection of Ola leaf book drug remedies mentions some drug recipes for *Avasadana karma*. This study was designed to assess the effectiveness of *Avasadana Karma* on a chronic wound. In the present study, a 60-year old male patient visiting the IPD with a chronic non healing ulcer was selected for *Avasadana karma*. An elevated fleshy mass (5 cm x 2 cm x 1 cm) was present in the middle of the wound which hampered approximation of wound edges beyond the mass. Patient was not fit for instrumental excision due to his age and low haemoglobin levels. Daily dressing was done with paste mentioned in thalapathe pillium which contain goraka fruit (10 g) paste, tamarind leaf paste (10 g) and purified copper sulphate powder. It was observed that the tissue contacted with paste was necrotized by the next day. Necrotized tissue was removed manually using surgical instruments. The study was done for a period of 30 days. The dimensions and attributes of the ulcer were systematically measured weekly and the result was assessed. Elevated mass like fleshy growth was completely removed and wound bed was clean after 2-3 days indicating that the above mentioned drugs have tissue necrotizing property. The result shows that topical application of paste is effective in *Avasadana karma* – stimulation of necrotize hypergranulation tissue formation of *Dushta vrana*.

Keywords: *Avasadana karma, Hypergranulation, Dushta vrana, Traditional formula*

Integrative Ayurveda treatment protocol for *Uttana Vatarakta*: A clinical case report with symptomatic outcomes

K. K. A. Nilani¹, R. D. H. Kulathunga², E. D. T. P. Gunaratna²

¹*Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka*

²*Department of Ayurveda Medicine and Indigenous Medicine, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka*

Uttana Vatarakta, a superficial manifestation of *Vatarakta*, resembles stasis dermatitis with vascular involvement and arises due to the vitiation of *Vata* and *Rakta doshas*. The aim of this observational case study was to evaluate the effectiveness of a comprehensive Ayurvedic treatment regimen in managing the clinical symptoms of *Uttana Vatarakta* in a single patient. A 36-year-old female presenting with severe itching, burning sensation, pricking pain, oozing, and skin discoloration over both lower limbs for three months was selected for the study. She underwent a 45-day individualized Ayurvedic treatment protocol, including internal medications such as *Vasa Guduchi Kashaya*, *Panchamooli Laghu Draksha Kashaya*, and *Panchatikta Ghrita*, along with external therapies such as *Abhyanga*, *Seka*, and *Upanaha Sweda* using *Pinda Taila* and *Neelyadi Taila*. Symptom assessment was conducted using the Visual Analogue Scale (VAS), Pruritus Severity Scale (PSS), oozing scores, and photographic documentation. Results showed 100% relief in pain, burning, and oozing; 89% in itching; and 80% improvement in skin discoloration. These results suggest that the integrated approach demonstrated significant efficacy, emphasizing the potential of classical Ayurvedic management in chronic dermatological conditions recommending further studies with larger sample sizes.

Keywords: *Vatarakta*, *Ayurveda*, *Itching*, *Static dermatitis*

Literature review on medicinal value of Agnimantha in management of obesity (Atisthaulya)

L. M. S. P. H. De Silva¹, K. I. W. K. Somarathna²

¹*Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka*

²*Department of Ayurveda Medicine and Indigenous Medicine, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka*

Obesity or Sthaulya/Atisthaulya in Ayurveda is a growing global health issue requiring drug-free reward-based therapeutic measures. Agnimantha (*Premna serratifolia* L.) churna is amongst the Ayurvedic classical medicines with claimed weight control efficacy. To critically review the published literature on the effectiveness of Agnimantha churna in obesity treatment, taking into account traditional applications and contemporary research findings. Systematic literature search was conducted through diverse databases including PubMed, Ayurvedic classical literature, and research databases. Research studies comparing the anti-obesity effect of Agnimantha churna, its phytochemical profile, and clinical applications were included. Literature provides overwhelming evidence for the therapeutic effectiveness of Agnimantha churna in the treatment of obesity through various mechanisms such as metabolic improvement, lipid control, and inflammation modulation. Clinical trials depict significant reductions in body weight, BMI, and anthropometric values. Agnimantha churna is effective for the treatment of obesity with good safety, justifying its classical use in Atisthaulya chikitsa.

Keywords: *Agnimantha churna, Obesity, Sthaulya, Atisthaulya, Premna serratifolia, Ayurveda, Weight management*

Evaluation of effect of *Koladi Upanaha Sweda* in *Janu Sandhigata Vata* (knee osteoarthritis)

M. I. J. Jayakody¹, R. D. H. Kulatunga², E. D. T. P. Gunaratne²

¹*Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka*

²*Department of Ayurveda Medicine and Indigenous Medicine, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka*

Osteoarthritis (OA) is a degenerative joint disease characterized by the progressive degradation of cartilage and bone in the joints, causing pain, stiffness, and reduced mobility. In Ayurveda, this condition referred to as *Janu Sandhigata Vata* (knee OA) is particularly prevalent and affects millions globally. *Upanaha Sweda* is one of the modalities of *Swedana karma* used widely in the management of *Janu Sandhigata Vata*, which is found to be helpful clinically. This randomized, single-blind clinical study evaluated the efficacy of *Koladi Upanaha Sweda* for managing symptoms of *Janu Sandhigata Vata*. The study aimed to assess its effects on pain, swelling, stiffness, crepitus and range of movement in patients with knee OA with different contact time. Ethical clearance was taken prior to the study. Sixty patients with primary knee OA, aged 40-70 were randomly assigned to two groups. In Group A, *Koladi Upanaha* was applied and retained on the skin for 12 hours, whereas in Group B, the same treatment was applied, but retained only for 3 hours daily over 14 consecutive days. Both subjective and objective parameters were used to evaluate the treatment based on clinical observations before and after the intervention. Data were analyzed using the Wilcoxon Signed-Rank Test and Mann-Whitney U Test. Total results were assessed on the basis of percentage improvement in the clinical features. It was observed that patients of Group A showed better results as compared to Group B. In Group A, patients showed complete remission in pain, stiffness, crepitus and range of movement. Patients showed maximum improvement in swelling. In Group B, patients showed complete remission in pain, maximum remission in stiffness, moderate improvement in swelling and crepitus and mild improvement in range of movement. This study offers evidence for the use of *Koladi Upanaha Sweda* as a complementary treatment for knee OA, with recommendations for further research to validate the long-term benefits.

Keywords: *Koladi, Sandhigata Vata, Upanaha*

Analyzing the efficacy of *Amritadya Guggulu* and *Bhramaree Pranayama* on hyperlipidemia

A. B. Dharmarathna¹, K. C. Perera²

¹*Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka*

²*Jayalath Medical Centre, Mulleriyawa New Town, Sri Lanka*

Disproportionately high lipid concentration in blood is a characteristic of hyperlipidemia which is mentioned as *Medo Roga* in Ayurveda. Physiological stress is a cause of hyperlipidemia and *Bhramari Pranayama* produces a relaxed state of mind. Hyperlipidemia increases a person's risk of developing hypertension. The objective of this study was to analyze the efficacy of *Amritadya Guggulu* (AG) and practice of *Bhramaree Pranayama* in hyperlipidemic patients. Study was a randomized, clinical study with 8-week treatment and 3 month follow up periods. Ethical clearance was obtained from the Institute of Indigenous Medicine, University of Colombo. Total of forty-four hyperlipidemic patients with total cholesterol (TC) >240 mg/dL, of both genders, aged between 30 to 79 years, were randomly selected from outdoor patient department of *Swastavritta* clinic, National Ayurveda Teaching Hospital, Borella. Selected patients were treated with AG powder and practice of *Bhramaree Pranayama*. All the symptoms showed improvement ($p < 0.05$), indicating strong statistical evidence of improvement. Thirst, hunger, hyperhidrosis, body odour, body strength, sexual performance and breathing difficulty all have p -values < 0.001 , showing highly significant improvements. There was significant reduction in TC ($p < 0.01$), LDL ($p < 0.05$) and Risk Ratio ($p < 0.05$) and VLDL ($p < 0.05$) after the treatment. Statistically significant reduction in Body Mass Index (BMI) ($p < 0.01$), weight ($p < 0.01$), systolic blood pressure ($p < 0.01$), diastolic blood pressure ($p < 0.05$) were observed after the treatment. After the treatment kidney function (SGOT, SGPT), serum creatinine, GFR did not show a significant change ($p > 0.05$). Present study concluded that *Amrithadya Guggulu* and *Bhramaree Pranayama* were significantly effective in treating hypolipidemia.

Keywords: *Amrithadya Guggulu, Bhramaree Pranayama, Hyperlipidemia, Lipid profile, Medo roga*

Issues and challenges related to Ayurveda Wellness Tourism development in Sri Lanka: Perspective of Ayurveda health professionals

M. V. S. E. Dharmapala¹, W. K. A. C. Gnanapala²

¹*Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka*

²*Department of Tourism Management, Sabaragamuwa University of Sri Lanka*

Ayurveda Wellness Tourism (AWT) is gaining global recognition as travelers increasingly seek effective solutions for health concerns and illness prevention. Rooted in traditional Ayurvedic principles, AWT emphasizes a holistic connection with nature, offering restoration and rejuvenation through a tranquil and cost-effective alternative to Western medicine, particularly in response to modern sedentary lifestyles. Sri Lanka, with its tropical climate, rich natural resources, and well-established Ayurvedic system, has significant potential to position itself as a leading AWT destination. While tourism remains a major contributor to Sri Lanka's GDP, the wellness segment remains underdeveloped. Ensuring high standards of treatment and service delivery, alongside adherence to international regulations, is vital for sustainable growth. This study investigates the challenges and opportunities for AWT in Sri Lanka, with insights drawn from interviews with 21 Ayurvedic practitioners. Key issues identified include limited government support, shortages of qualified personnel, and inconsistent regulatory practices. The findings highlight the urgent need for a comprehensive national strategy tailored to Sri Lanka's unique context. Strengthening the regulatory framework, enhancing professionalism, and fostering effective information sharing are crucial for realizing the full potential of Ayurveda Wellness Tourism in the country.

Keywords: *Ayurveda Wellness Tourism, Ayurveda Treatment Regulatory Framework, Healthcare standard, Health and Well-being*

Physicochemical and phytochemical analysis of Majoon e Gheekawar herbal formulation

B. M. Rishad¹, M. Shiffa², N. Fahamiya³

¹Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka

²Department of Unani Clinical Medicine, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka

³Department of Unani Pharmacology, Faculty of Indigenous Medicine,
University of Colombo, Sri Lanka

Majoone Gheekawar (MG) is a Unani herbal formulation mentioned in the National Formulary of Unani Medicine (NFUM), India, which has been used for centuries in the Unani system of medicine. The drug is known for its pharmacological actions such as *Mohallile Waram* (anti-inflammatory), *Muqawwie A'asab* (nerve stimulant), laxative, diuretic, antioxidant, *Musaffie Khoon* (blood purifier), *Mushile Akhlat* (evacuation of morbid materials), liver stimulant, and immune modulator. These diverse properties make MG a valuable option for addressing various health conditions. WHO guidelines emphasize that standardization is a critical first step before any experiment claiming safety and efficacy, particularly for herbal medicines. Considering the above facts and the effectiveness of MG, this study was aimed at establishing the physicochemical and phytochemical standards for this herbal formulation. This formulation contains three ingredients, namely, *Maghze Gheekawar* (*Aloe vera* pulp), *Sheere Gao* (cow's milk), and *Qand Safaid* (sugar). In this study, ingredients were purchased from a local market, and MG was prepared according to NFUM. The physiochemical evaluation was carried out according to WHO guidelines for quality control for herbal medicine, such as organoleptic parameters, loss on drying, pH, extractive values, ash values, and preliminary phytochemical analysis. MG is a light brown semi-solid preparation with a milky smell and sweet taste. The results of physicochemical analysis revealed that loss on drying is $15.5 \pm 0.26\%$; the pH of 1% and 10% solutions are 5.4 and 5.6, respectively. Also, the total ash value is $2.8 \pm 0.32\%$, and acid-insoluble ash is $1.2 \pm 0.2\%$. The aqueous extractive value is $75 \pm 0.2\%$, while the methanolic extractive value is $45 \pm 0.42\%$. Further, qualitative phytochemical analysis revealed that the aqueous extract contains carbohydrates, glycosides, phenolic compounds, flavonoids, proteins, and amino acids. In conclusion, the physicochemical and phytochemical results of MG as established in this study could be used as a standard reference for future studies.

Keywords: *Majoon e Gheekawar, Unani medicine, Physicochemical, Phytochemical*

A comparative clinical study on the efficacy of *Rasna Panchaka* and *Rasna Saptaka Kwatha* with *Murungadi Lepa* (local application) in the management of *Amavata* (Rheumatoid Arthritis)

A. M. M. Paranagama, S. M. S. Samarakoon

Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka

Amavata is a chronic inflammatory disorder described in Ayurveda that causes significant impairment in daily functioning due to intense joint pain and stiffness. The present study aims to evaluate the efficacy of *Rasna Panchaka Kwatha* and *Rasna Saptaka Kwatha* with *Murungadi Lepa* in the management of *Amavata*. Based on the clinical characteristics, this disease can be correlated with Rheumatoid Arthritis (RA) as described in contemporary medicine. This study was conducted as a randomized, single-blind, parallel-group, comparative clinical trial on 60 patients diagnosed with *Amavata*, admitted to the Inpatient Department (IPD) of National Ayurveda Teaching Hospital, Borella. Assessment was done based on assessment criteria applied in the study (Sajjanar, 2018). The patients were randomly allocated into two groups of 30 each. Group A received *Rasna Panchaka Kwatha* (120 ml) and Group B received *Rasna Saptaka Kwatha* (120 mL), both along with topical application of *Murungadi Lepa* twice daily for 14 days. After the intervention, when comparing data of Group A with Group B it was observed that subjective parameters like Sandi shoola, Sandi shotha, Sandi sthabdata, Aruchi, Thrushna, and Jawara, were statistically highly significant ($p < 0.001$) except Angamarda, Alasya, Apaka, Bahumutrata, and Nidra Viparya, which were significant with $p < 0.05$. Objective parameters observed that the improvement of the mean values of the Rh factor was highly significant ($p < 0.001$). However, ESR, CRP, and Hb count were not significant ($p > 0.05$). In the overall improvement of both Groups A and B, it was observed that the majority of the subjective parameters were markedly improved following the intervention of *Rasnadi Sapthakaya* along with *Murungadi Lepa*. The combination of *Kwatha* and *Murungadi Lepa* demonstrated promising results and may be integrated into the *Amavata* management protocol for better patient outcomes.

Keywords: *Amavata, Murungadi Lepa, Rheumatoid Arthritis, Rasna Panchaka Kwatha, Rasna Saptaka Kwatha*

***Nirgundi Lashunam Shigru Kashaya* in the management of *Avabahuka* (frozen shoulder): A single case study**

R. M. Peiris¹, S. M. S. Samarakoon²

Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka

Avabahuka is a type of *Vatavyadhi* caused by vitiated *Vata Dosha* and associated with *Kapha Dosha*. It closely resembles frozen shoulder and significantly affects the quality of life of the patient. This case study focuses on the management of *Avabahuka* using *Nirgundi Lashunam Shigru Kashaya*, as mentioned in traditional text *Sarasamkshepayaya*. A 59-year-old female presented to the National Ayurveda Hospital, Sri Lanka, with right shoulder pain (*Shoola*), stiffness (*Sthabdhata*), and restricted movements (*Bahupraspanditahara*) for one month. This clinical condition was diagnosed as *Avabahuka*. The treatment duration was 14 days, during which she was administered *Nirgundi Lashunam Shigru Kashaya*, 120 mL twice daily before meals. Assessment included both subjective and objective parameters. The range of movement was assessed by using a goniometer, whereas functional ability was assessed using the Shoulder Pain and Disability Index (SPADI). Initial investigations revealed an ESR of 68/mmh and mild degeneration of the acromioclavicular (AC) joint on X-ray. Following the treatment, the patient experienced complete pain relief, significant reduction in stiffness, improved shoulder function without support. The range of motion improved, with flexion increasing 100° to 180°, extension 15° to 50°, abduction 100° to 180° and both internal and external rotation 15° to 90°. SPADI score showed marked improvement, with pain reduced from 76% to 16%, disability from 87.5% to 16.25%, and the total score from 83% to 15.38%. ESR was reduced to 37/mmh, indicating a decrease in inflammatory activity and no change was observed in the X-ray findings. This case suggests that *Nirgundi Lashunam Shigru Kashaya* is effective in the management of *Avabahuka*. Further clinical studies with larger samples are recommended to validate these findings.

Keywords: *Avabahuka, Frozen shoulder, Nirgundi Lashunam Shigru Kashaya*

Effect of *Bilwadi Panchamula* along with *Suryanamaskara Asana* in the secondary prevention of obesity (*Athisthauilya*)

B. L. Edirisinghe¹, W. M. S. S. K. Kulathunga²

¹Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka

²Department of Ayurveda Pharmacology, Pharmaceutics and Community Medicine,
Faculty of Indigenous Medicine, University of Colombo, Sri Lanka

Acharaya Charaka described *Athisthauilya* as a *Nanathmaja vikara of Kapha*. Globally, there are more than 1 billion overweight adults and 300 million of them are obese. In Sri Lanka, the prevalence of overweight and obesity is high among adults. This study aimed to assess the efficacy of *Bilwadhi Panchamula* along with *Suryanamaskara asana* in the secondary prevention of obesity (*Athisthauilya*). The clinical study was based on a prospective randomized study carried out among 45 patients over a duration of one year. Patients were given the *Bilwadi Panchamula* decoction with bee honey twice a day along with practicing *Suryanamaskaraya*. Ethical clearance was obtained from the Ethics Review Committee (ERC) of the Faculty of Indigenous Medicine in 2022. The assessment was done by using mean weight, body mass index, waist circumference and mid upper arm circumference as objective parameters. Data were statistically analyzed by using IBM SPSS Statistics Version 29.0.0.0 (2022). It was observed that objective parameters from the pre-test to the post-test were markedly reduced ($p < 0.001$) which is statistically highly significant in the variables of obesity. The total cholesterol level also improved with high statistical significance ($p < 0.001$). In subjective parameters, a marked improvement was observed in the mean value of *sphik chalata*, *sthana chalata*, *udara chalata*, movements of cheek, movement of the thigh, *ayasena swasa*, *alpa vyayama*, *swedadhikya*, *nidradhikya*, *ati pipasa*, *daha*, *Kshudra swasa* and *Janusandhi shoola*. Also, *t* values were higher than the critical value and these objective parameters of *Athisthauilya* were statistically highly significant ($p < 0.001$).

Keywords: *Athisthauilya*, *Bilwadhi Panchamula*, *Suryanamasakaraya*

A comparative clinical study on the effect of Guda Haritaki and Amurta Choorna in the management of Panduroga (iron deficiency anemia)

S. K. P. Waidyaratna, S. M. S. Samarakoon

Postgraduate Institute of Indigenous Medicine, University of Colombo

Panduroga is one of the prevalent types of nutritional disorder. It is a Pitta predominant disease characterized by reduction of the complexion, strength, unctuousness and Ojas in the body. It can be correlated with anemia based on its signs and symptoms. Iron deficiency anemia is a condition of reduction in the hemoglobin or red blood cell concentration of the peripheral blood in relation to age and sex. Classical texts recommend Guda Haritaki and Amurta Choorna for Panduroga. The main objective of the study was to comparatively evaluate the effect of Guda Haritaki and Amurta Choorna on Panduroga. The study was conducted at OPD of National Ayurveda Teaching Hospital Borella. Data were collected from 60 patients of age between 20-70 years from either sex. Thirty patients of Group A were treated with Guda Haritaki and 30 patients of Group B were treated with Amurta choorna twice a day for 90 days. The assessment was based on subjective parameters and objective parameters. Data were analyzed using SPSS statistical software. Effect of Guda Haritaki and Amurta Choorna were highly significant ($p < 0.000$) in both groups. Comparative effect between Group A and Group B was statistically not significant ($p > 0.05$). The overall effect of therapy indicates that Group A markedly improved by 66.7% and Group B by 60%. Haritaki has Agni Deepana, Ama Pachana and Anulomana properties and Guda has Agni Deepana and Ashruk Prasadana properties. In the present study, Guda Haritaki showed more significant results than Amurta Choorna due to enhanced bioavailability of nutrition in Guda Haritaki.

Keywords: *Panduroga, Iron deficiency anemia, Guda Haritaki, Amurta Choorna*

A comparative clinical study on the effect of *Agnimantha Shilajit Yoga* and *Bilvadi Yoga* in the management of *Sthaulya* w.s.r. to overweight and obesity

K. K. I. Eranga¹, K. G. C. Dissanayake²

¹*Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka*

²*Faculty of Indigenous Medicine, Gampaha Wickramarachchi University of Indigenous Medicine, Sri Lanka*

Obesity (*Sthaulya*) is a chronic lifestyle disorder described in Ayurveda as a condition associated with *Medo Dhatu Vriddhi* and *Srotorodha*. This randomized clinical trial aimed to evaluate and compare the efficacy of *Agnimantha Shilajit Yoga* (AS) and *Bilvadi Yoga* (BY) in the management of obesity. Sixty clinically diagnosed patients were randomly allocated into two groups: Group A received AS (0.5 g twice daily), and Group B received BY (5 g twice daily with 10 mL honey). The duration of treatment in both groups was 12 weeks with follow-up for 2 months after the completion of the treatment. Both groups were assessed on subjective and objective parameters over the treatment period. The study population was predominantly male (53.34%), aged between 36-47 years (51.70%), mostly married (85%), with a preference for spicy food (50%), *Krura Koṣṭa* (63.35%), *Viṣamagni* (88.30%), and a mixed diet (95%). Group A showed statistically significant improvement in subjective symptoms such as reduction in pendulous body movements, heaviness, excessive perspiration, thirst, and hunger ($p < 0.001$). Objective parameters such as body mass index - BMI Decreased from 3.60 to 2.00 ($p < 0.001$), indicating a marked reduction in weight status. Lipid profile (Mean value of total cholesterol reduced from 244.68 to 189.04 units??), liver enzymes (AST, ALT, ALP), creatinine levels, waist and hip circumferences also improved significantly ($p < 0.001$). Group B demonstrated notable reductions in localized adiposity, including mean value of thigh circumference (from 57.56 to 54.50 cm) and mean value of arm circumference (from 34.86 to 31.46 cm) ($p < 0.001$), though improvements in other parameters were less pronounced compared to Group A. Intergroup comparison revealed that AS was significantly more effective in most essential obesity-related parameters, while BY was more effective in targeted fat reduction. Both formulations were found to be effective in managing obesity, but AS demonstrated a broader and more comprehensive efficacy in the Ayurvedic management of *Sthaulya*.

Keywords: *Sthaulya, Obesity, Overweight, Agnimantha shilajit yoga, Bilvadi yoga*

Efficacy of Ayurveda management on Vatala Yoni Vyapad w.s.r. endometriosis: A single case study

U. P. P. Wijethunge¹, K. P. K. R. Karunagoda², Y. A. U. D. Karunarathne²

¹Postgraduate Institute of Indigenous Medicine, University of Colombo, Sri Lanka

²Department of Ayurveda Surgery, ENT, Ophthalmology and Gynecology, Obstetrics and Pediatrics,
Faculty of Indigenous Medicine, University of Colombo, Sri Lanka

Endometriosis is a condition of the ectopic implantation of endometrial glands and stroma outside of the uterus which is characterized with dysmenorrhea. Of reproductive-aged females 10% are affected with endometriosis world-wide. Dysmenorrhoea means painful menstruation, whereas secondary dysmenorrhea is associated with underlying pathology in female reproductive system such as fibroids, endometriosis, cyst, adenomyosis. Among the *Vimshathi Yoni Vyapadas* described by *acharayas* in Ayurveda, *Vatala Yoni vyapad* is one of them. Stiffness, pricking pain in vagina, pain in groins and flanks etc. are the *lakshanas* which are mentioned in the literature. Menstrual pain mentioned in Ayurveda literature as *Kashtartava*. *Vatala yoni vyapad* can be caused by *Prathiloma Gati* of Vitiated *Apana Vayu* which is a state of *Vyadhi Samkara avastha* of *Udavarthini Yoni vyapad*. We aimed to evaluate the Ayurveda management approach on endometriosis through a single case study. A 33-year-old *Vata Prakruti* female with severe dysmenorrhea (WaLIDD score 10) and BP 120/70 mmhg, pulse rate 68/ min, BMI 18.44 kg/m² was treated with oral medications and external treatments by *Ama pachana*, *Agni deepana*, *Mrudu Shodhana*, *Vatanulomana* at OPD level for 28 days, *Pancha karma* procedures as *Matra Basti* and *Udara pattu*, *Nadi sweda* as *Sthanika chikitsa* in IPD for 5 days and *Shamana karma* for 14 days at OPD. She was advised to follow *Pathya Ahara* and *Viharana* accordingly. Vitals and menstrual pattern were observed on corresponding menstrual cycles. Assessment was done using WaLIDD scoring method before and after treatment. After completion of the treatment protocol within the due time period, the WaLLIDD score which was 10 before the treatment, reduced to 3 by 70 %. Ultrasound report proved the complete disappearance of the right-side ovarian cyst (Endometrioma). It proved that Ayurveda has successful treatment protocols for resolving *Vatala Yoni vyapad w.s.r. endometriosis* by *Samprapti vighatana*.

Keywords: *Vatala Yoni vyapad, Kashtartava, Dysmenorrhoea, Endometriosis*



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