

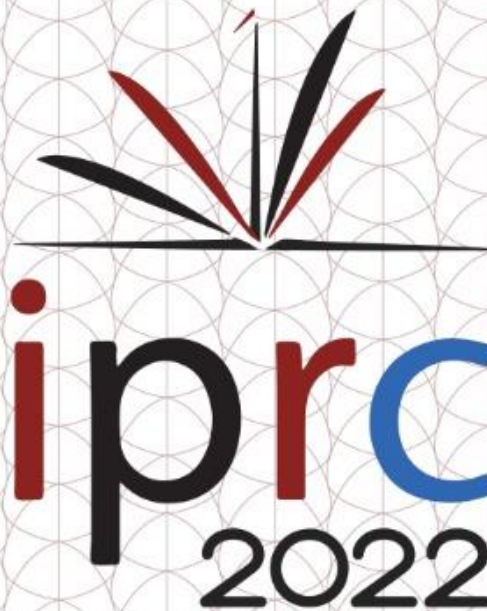


UNIVERSITY OF
KELANIYA

Faculty of
Graduate Studies

22nd INTERNATIONAL POSTGRADUATE RESEARCH CONFERENCE (IPRC) 2022

**"RESEARCH AND INNOVATIONS IN CRISIS
SITUATIONS"**



ABSTRACTS

Organized by
THE FACULTY OF GRADUATE STUDIES
University of Kelaniya, Sri Lanka



22nd Conference on Postgraduate Research

**International Postgraduate Research Conference
(IPRC) 2022**

"Research and Innovations in Crisis Situations"

Abstracts

28th December 2022



**Faculty of Graduate Studies
University of Kelaniya, Sri Lanka**

© 2022 - Faculty of Graduate Studies

22nd Conference on Postgraduate Research

International Postgraduate Research Conference (IPRC) 2022

"Research and Innovations in Crisis Situations"

Responsibility of the content of the abstracts included in this publication remain with the respective authors.

Web: <https://conf.kln.ac.lk/iprc/index.php>

Email: iprc@kln.ac.lk

Telephone: +94112903952/3

Faculty of Graduate Studies

University of Kelaniya

Sri Lanka



Message from the Vice-Chancellor



It is with great pleasure that I welcome you to the International Postgraduate Research Conference 2022, organized by the Faculty of Graduate Studies, University of Kelaniya. The University of Kelaniya takes great pride in hosting our flagship research conference, as it is a forum for researchers and scholars to share knowledge, information, exchange experiences, to present innovative concepts and research related to all areas of Commerce and Management, Science, Medical Sciences, Humanities, Social Sciences, Computing and Technology, Multi-disciplinary Studies and Digital Learning.

The theme of IPRC 2022, Research and Innovations in Crisis Situations, is relevant to all researchers in Sri Lanka given the fact that this year, we have experienced the worst economic crisis since independence, following closely on the crisis situation created by the COVID19 pandemic. We hope that the conference will provide an opportunity for all participants to reflect on this theme, and lead to future research collaborations and strengthening of our network of research partners. I am sure that the presentations and deliberations will provide a great opportunity to gain insightful knowledge about the projects being conducted in the region. Through the interactions that will take place at IPRC 2022, we expect to stimulate an active research environment that is relevant to all our communities.

I would like to thank and congratulate the Dean of the Faculty of Graduate Studies, Prof Kapila Seneviratne, the conference Organizing Committee, and the supporting staff for organizing this event. I would also like to thank the researchers, reviewers, editors and other academics who contributed to sustaining the core values of quality and innovation throughout this conference. I wish all conference participants very fruitful deliberations.

Senior Prof. Nilanthi Renuka de Silva
Vice-Chancellor
University of Kelaniya
Sri Lanka

Message from the Dean, Faculty of Graduate Studies



Research propels humanity forward. Curiosity is the driving force behind research. The modern life we enjoy is all due to the discoveries made by researchers fueled by this curiosity. Dire needs that arose during crisis situations have led to many wonderful discoveries. Modern research is structured based on scientific and methodological approaches. Trial-and-error experiments and lifelong natural “clinical” testing conducted by humans in the beginning, have also provided an immense service to the progression of humankind. This means that humans started generating new knowledge even before the stone age. Humans use information from the existing knowledge pool and add new knowledge to it. The beauty of knowledge is it always builds.

We are humbled by the intellectual joy of being able to add at least a drop of new knowledge through the IPRC-2022 to the ocean of existing knowledge generated by humans over many centuries.

Wishing you a fruitful day,

Senior Prof. N. A. K. P. J. Seneviratne

Conference Chair and

Dean of the Faculty of Graduate Studies

University of Kelaniya

Sri Lanka

Keynote Speaker – Prof. Arti Kashyap



Dr. Arti Kashyap is an Associate Professor at IIT Mandi in the School of Basic Sciences. She earned her Ph.D. degree from IIT Roorkee in 1996. She has been working with IIT Mandi since its inception. She has guided 9 Ph.D. students and published more than 100 research papers in International Journals. Dr. Arti Kashyap was awarded Simons Associateship from ICTP, Italy in 2015. Very recently, she has been selected as one of the role models featured in the book “She Is: 75 Women in Science, Technology, Engineering, Arts and Mathematics (STEAM)”. The announcement was made by the Principal Scientific Adviser Prof. K Vijay Raghavan and His Excellency, The British High Commissioner, Mr. Alex Ellis in Delhi on 3rd March 2022.

The primary area of research of Dr. Arti Kashyap is the study of magnetic materials using the first principles approach and the use of big data technologies for various applications including material design. Apart from this, she has a keen interest in socio-technical research areas; specifically in the space where technological intervention can fulfil societal needs. Her work on the use of dry pine needles to contain forest fires has already been accepted as a viable solution and has shaped the policy of the Forest Department of Himachal Pradesh. The solution involves creating biomass fuel from dry pine needles which can also help generate employment by developing small-scale industries for natural resources. Recently, she also participated in the UT level consultation meeting in Jammu for the deliberations on the theme “Forests for Livelihood”.

Dr. Arti Kashyap is the Chair of the Women Centre Committee at IIT Mandi and is actively involved in promoting the girl students in science and technology field.

Conference Committee

Convener

Senior Professor Nilanthi Renuka de Silva
Vice-Chancellor
University of Kelaniya, Sri Lanka

Conference Chair

Senior Professor N. A. K. P. J. Seneviratne
Dean, Faculty of Graduate Studies

Conference Secretary

Mr. K. B. S. L. Wijeratne
Deputy Registrar, Faculty of Graduate Studies

Editorial Board

Prof. N. Jayathilaka - Department of Chemistry
Prof. W. M. Semasinghe - Department of Economics
Dr. R. A. I. C. Karunaratne - Department of Human Resource Management
Dr. H. S. M. M. Jayawardene - Department of Modern Languages
Prof. A. I. Diwakara - Department of Sinhala
Dr. T. Rupasinghe - Department of Applied Computing

Conference Coordinators

Faculty of Commerce & Management Studies: Dr. R. M. S. Bandara

Faculty of Computing & Technology: Dr. Chanaka Udayanga

Faculty of Medicine: Dr. Anura Dissanayake

Faculty of Humanities Ms. Kaumadie Bamunusinghe

Faculty of Science :Dr. K. M. D. C. Jayathilake *and*

Dr. Chamila Kadigamuwa

Faculty of Social Sciences: Prof. Osantha Nayanapriya

Board of Study in Multi-Disciplinary Studies: Dr. W.V. A. D. Karunarathne

Financial Coordinator: Mrs. S. S. Gonapinuwala

Conference Management System Administrator: Mrs. M. S. Hettiarachchi

Technical Coordinator: Ms. N. R. P. W. Ranathunga

Sessions Chairs

Prof. Dilrukshi Ratnayake
Prof. Jeewantha Premaratne
Prof. K. B. Jayawardene
Prof. M. G. Kularatne
Prof. Nayana Gunathilaka
Prof. S. S. Weligamage
Prof. Sena Rathnayake
Prof. Suranga Wickramarachchi
Prof. Tissa Amarakoon
Prof. Wasantha Subasinghe
Ven. Prof. N. Dhammadinna Thero
Dr. Amila Withanaarachchi
Dr. Anura Dissanayake
Dr. Aruna Wanninayake
Dr. Chaminda Abeysinghe
Dr. Jayangika Dahanayake
Dr. Kaushalya Yatigammana
Dr. Medha Gunaratna
Dr. Priyanwada Wanigasooriya
Dr. R. A. I. C. Karunarathne
Dr. Ramani Jayasingha
Dr. Ruwani Manampeeri
Dr. Sidath Liyanage
Dr. Thusitha Wickramasinghe
Dr. Vindya Weerawardana
Dr. Dulith Abeykoon
Mr. Anuradha Subasinghe
Mr. Hasitha Pathirana
Mrs. Kumudu Gamage
Ms. Lanka de Silva

Session Coordinators

Mrs. Bhagya Matarahewage
Mrs. Indeewari Galagama
Mrs. Sulochana Rathnayaka
Ms. Geethani Mahalekamge
Ms. Himasha Perera
Ms. Santhusha Nawalahewa
Ms. Sasha Hewa
Ms. Vimansa Ranasinghe
Mr. E. A. C. P. Edirisinghe

Panel of Reviewers

Accounting, Business and Management

Prof. D. M. R. Dissanayake
Prof. U. L. T. P. Gunasekare
Dr. Chatura Liyanage
Dr. Nisansala Wijekoon
Dr. R. A. I. C. Karunaratne
Mr. D. K. Thilina
Mr. M. R. P. Wijesinghe
Mr. Nisal Gunawardane
Mrs. K. D. G. Nayomi Wijesinghe
Ms. W. D. N. Aruppala

Computing

Dr. Dhammika Weerasinghe
Dr. Rajitha Tennekoon
Dr. Sidath Liyanage

Digital Education

Prof. Maya Gunawardena
Dr. D. Ediriweera
Dr. Gamini Wijayarathna
Dr. Laalitha Liyanage
Dr. Kaushalya Yatigammana

Science, Technology, Engineering and Mathematics

Snr. Prof. N. A. K. P. J. Seneviratne
Prof. C. S. K. Rajapakse
Prof. Meththika Vithanage
Prof. N. Jayathilaka
Prof. Nayana Gunathilaka
Prof. P. K. D. D. P. Pitigala
Prof. R. M. C. S. Ratnayake
Prof. Rangika Bandara
Prof. Suranga Wickramarachchi
Prof. Zubia Rashid

Prof. Nuwan Perera
Prof. Rangika Koralage
Prof. Munawar Sultana
Dr. A. L. A. K. Ranaweera
Dr. B. G. N. Sewwandi
Dr. B. M. T. Kumarika
Dr. Chamila Kadigamuwa
Dr. J. A. Seneviratne
Dr. Jayangika Dahanayake
Dr. Jinendra Dissanayake

Medical Sciences

Snr. Prof. A. R. Wickremasinghe
Snr. Prof. Chrishantha Abeysena
Snr. Prof. N. P. Sunil-Chandra
Snr. Prof. Nilmini Silva Gunawardene
Snr. Prof. P. S. Wijesinghe
Snr. Prof. Ranjan Premaratna
Prof. A. Pathmeswaran
Prof. C. D. Ranasinha
Prof. Madawa Chandratilake
Prof. Sachith Mettananda

Prof. Niranga M. Devanarayana
Dr. Anura Dissanayake
Dr. D. Atapattu-Bakmeewewa
Dr. H. P. Wakkumbura
Dr. Kavinda Dayasiri
Dr. K. P. K. R. Karunagoda
Dr. Shiromi Perera
Dr. Y. S. Wijayasinghe
Dr. O. T. M. R. K. S. B. Kalawana

Humanities and Social Sciences

Snr. Prof. Patrick Ratnayake	Ven. Kurupita Assajithissa Thero
Ven. Prof. Nedalagamuwe Dhammadinna Thero	Ven. Udawela Rewatha Thero
Prof. H. R. Anulawathie Menike	Mr. Ananda Abeysundara
Prof. J. M. Sudharmawathie	Mr. Anuradha Subasinghe
Prof. K. B. Jayawardena	Mr. Aruna Lokuliyana
Prof. K. M. P. Kulasekera	Mr. D. A. K. Anupama
Prof. M. G. Kularatne	Ms. D. G. T. A. Jayasinghe
Prof. Prashanthi Narangoda	Mr. Hasitha Pathirana
Prof. R. A. S. P. Bandara	Mr. Jayamal de Silva
Prof. Rajitha P. Kumara	Mr. Sampath Perera
Prof. U. B. Karunananda	Mr. T. M. M. K. Tennakone
Ven. Prof. Naotunne Wimalagnana Thero	Mr. Upul Jayantha Ranepura
Prof. Wasantha Subasinghe	Mr. Wijayananda Rupasinghe
Ven. Dr. Lagumdeniye Piyarathana Thero	Mrs. Dulanga Gunarathna
Dr. Chandeeera Gunawardena	Mrs. E. A. I. R. Edirisooriya
Dr. Anjalee Wickramasinghe	Mrs. K. N. Gamage
Dr. Anusha Salwathura	Ms. D. M. S. V. Balasooriya
Dr. Chamila Siriwardene	Ms. H. M. Oshadhi Vindya Herath
Dr. Chaminda Abeysinghe	Ms. Kaumadee Bamunusinghe
Dr. Champika Dharmadasa	Ms. K. M. D. Maheshika Bandaranayake
Dr. Chinthaka Maddegoda	Ms. Lanka De Silva
Dr. E. A. D. Anusha Edirisinghe	Ms. Samanthika Priyadarshani
Dr. J. A. P. Kumari	
Dr. Manjula Gunarathna	
Dr. N. D.G. Gayantha	
Dr. Namali Suraweera	
Dr. Praba Manuratne	
Dr. Priyanwada Wanigasooriya	
Dr. R. D. P. Sampath Rajapakshe	
Dr. S. H. Mahesh Pathmakumara	
Dr. S. M. Assella	
Dr. Udara de Silva	
Dr. Vindya Weerawardhana	

Organizing Support Committee

Mr. H. J. Jayawardena

Mr. A. S. D. Silva

Mr. R. M. K. S. K. Jayasinghe

Ms. P. G. C. Sudarshani

Ms. H. A. S. U. Hangawatte

Ms. K. G. S. N. Lakmali

Ms. W. G. W. Wedisinghe

Mr. J. P. Priyantha

Mr. K. L. K. P. Perera

Mr. D. Weerasinghe

Volunteers

Mr. Indika Munaweera

Mrs. Maduri Shanika

Ms. Jami Lamahewa

Ms. Lakshmi Wimalarathna

Mr. Chandula Sooriyawansa

Ms. Thilakshi Sarathchandra

Table of Content

Message from the Vice-Chancellor.....	i
Message from the Dean, Faculty of Graduate Studies.....	ii
Keynote Speaker – Prof. Arti Kashyap.....	iii
Conference Committee	iv
Sessions Chairs.....	v
Session Coordinators.....	v
Panel of Reviewers	vi
Organizing Support Committee	viii
Table of Content	ix

Accounting, Business and Management

Research facilitation for commercial agriculture sector in Sri Lanka on the key performance drivers: with special reference to the themes of ‘research for society’ and ‘economic gains’	1
Occupation stress and work-family conflict: A study in ABC Clothing (Pvt) Limited, Sri Lanka	2
Challenges and benefits of implementation of ISO 9001: 2015: The case of Department of Finance, University of Kelaniya, Sri Lanka	3
Foreign direct investment and gross domestic products growth in Sri Lanka: An autoregressive distributive lag bounds test approach	4
The role of ethics in human resource management	5

Computing and Digital Education

Freshmen's perceptions of blended learning in higher education; A case of University of Colombo Institute for Agro-Technology and Rural Sciences	7
Shard-based blockchain into social media platforms.....	8

Connectivism for improved learning outcomes in higher education in the digital age – A scoping review.....	9
ICT aided skill enhancement for moderately hearing-impaired youth.....	10
Impact of mobile application data usage on energy consumption.....	11

Medical Sciences

Value of multimodal instruction on improving procedural skill proficiency among medical undergraduates: A study from a Sri Lankan medical faculty.....	13
Procedural experience, confidence, and self-reported perceived competence among medical undergraduates: A study from a metropolitan university in Sri Lanka.....	14
Who teaches basic procedural skills: perspectives of medical undergraduates in a university in Sri-Lanka.....	15
Entomological and epidemiological investigations in a newly established focus of cutaneous leishmaniasis in Kegalle district, Sri Lanka.....	16
Presence of leishmaniasis causing agent, <i>Leishmania donovani</i> , in biting midges (<i>Culicoides sp</i>) at a disease endemic area of Sri Lanka: Could it be a probable vector?.....	17
The impact of the current crisis on patient attendance at Gynecology Clinic of Gampaha Wickramarachchi Ayurveda Teaching Hospital – Yakkala.....	18
The impact of the economic crisis on patient attendance at Pediatric Clinic of Gampaha Wickramarachchi Ayurveda Teaching Hospital – Yakkala.....	19
Timely intervention of Garbhani Paricharya to manage the increased tendency of gestational diabetes mellitus (GDM) (Garbhani Madumeha).....	20
Presence of very small embryonic like stem cells (VSEL) in human semen; A novel finding.....	21
Timely intervention of Garbhani Paricharya to manage the increased tendency of pregnancy induced hypertension (PIH) (Garbhani Atiraktachapa).....	22

Body weight status and implications on kidney health of the pediatric communities in the dry climatic zone in Sri Lanka: A cross-sectional study	23
Assessment of the distribution of <i>Aedes</i> breeding sites at the households of district of Gampaha	24
Study on the resting preferences of <i>Aedes aegypti</i> (Linnaeus) and <i>Ae. albopictus</i> (Skuse) adult mosquitoes in the district of Colombo.....	25
Virus infections in the exacerbation of asthma in children from a pediatric setting in Sri Lanka	26
Imaging intra-abdominal abscesses; A pictorial essay.....	27
A descriptive study on infections acquired in an intensive care unit of a secondary healthcare center in Sri Lanka.....	28
Precipitating factors of acute severe asthma among children of 3–15 years: A descriptive cross-sectional study.....	29
The physical and functional outcomes after ultrasound guided intramuscular botulinum toxin injections in ambulatory children with cerebral palsy attending to a multidisciplinary tertiary care center	30
Role of <i>Mycoplasma pneumoniae</i> in the exacerbation of childhood asthma in Sri Lanka.....	31
Comparison of Sebia capillary electrophoresis with the Bio-Rad VARIANT II HPLC in the evaluation of HbA2 in diagnosing beta thalassemia.....	32

Humanities and Social Sciences

A study of the hidden secrets of Saliya - Ashokamala's love story.....	34
An analytical study of thematic roles functioning in Hindi syntax.....	35
The musical culture of Ceylon Africans: A case study of <i>Maanja</i> tradition in the Sirambiadiya village, Sri Lanka.....	36
Poems in resistance in the early colonial period in Korea, through Yi Won-Rok and Yun Dong-Ju poets.....	37

Translation strategies of humor in subtitling with special reference to the English movie <i>Johnny English Strikes Again</i>	38
The impact of watching English video programs in English language acquisition as a second language (A case study conducted in Rathnapura and Kurunegala districts).....	39
The pronunciation and reading difficulties faced by the Sinhalese students when learning Hindi as a foreign language.....	40
A study on the application of the audio - description technique for the cinematic entertainment of visually impaired people with special reference to Sri Lankan audience.....	41
Identifying the role of sitar in Sri Lankan “ <i>Bodu Bethi Gee</i> ” genre	42
Western theory in non-western, lesser-known literary translation: Perils of Venuti’s foreignization in English translations of Sinhala novels	43
Effectiveness of using technology to enhance the English communication skills of students in the vocational stream of newly introduced 13 years of guaranteed education program: a case study of selected schools in the Kelaniya education zone.....	44
A comparative study of the depiction of paraphilic disorders in <i>Underpants thief</i> and <i>la pianiste</i>	45
The impact of integrating culture in developing listening and speaking skills in learning of French as a foreign language.....	46
Influence of Buddhism on the novel <i>Wismrit yatri</i> by Rahul Sankrityayan.....	47
Challenges encountered by English as a Second Language learners when acquiring English grammar implicitly via Zoom application	48
The challenges faced by students in the interpretation classroom.....	49
A study on the use of visual stereotypes in logo designs by Sri Lankan freelance logo designers	50
Examining the impact of video feedback as a teacher feedback method in English as a Second Language learners’ paragraph writing	51

Target language or the first language? Employing first language in teaching grammar for undergraduates in a second language classroom 52

Language dilemma of post-independence Ceylon: a socio-linguistic perspective 53

English as a Second Language learners' perception on portfolio: An effective learning activity . 54

මඤ්ජුලිභාෂිත වාස්තු විද්‍යාශාස්ත්‍රයෙහි නිර්දේශිත හස්ත මිනුම් ඒකකය 55

පශ්චාත් යුද්ධ සමයේ දේශීය කුටුම්භය කෙරෙහි ඇති වූ ආර්ථිකමය පීඩනය සමකාලීන ස්වභවය වේදිකා නාට්‍ය මගින් නිරූපණය වීම පිළිබඳ අධ්‍යයනයක්. (තෝරාගත් ස්වභවය නාට්‍ය පිටපත් ඇසුරින්) 56

කොරියානු භාෂාවේ සහ සිංහල භාෂාවේ රුචි පිළිබඳ තුලනාත්මක අධ්‍යයනයක්..... 57

“නෙළුම” සමකාලීන දේශපාලනික බලය සහ දෘෂ්ටිවාදයන් අර්ථගැන්වීමේ සංකේතයක් ලෙස; කොළඹ නාගරික දෘශ්‍ය අවකාශය ඇසුරෙන් 58

දෙමළ ක්‍රියා මූල වර්ගීකරණය හා අතීතකාල ක්‍රියා පද සාධනය පිළිබඳ අධ්‍යයනයක් 59

වර්තමාන ශ්‍රී ලංකාවේ අර්බුදකාරී තත්වය හමුවේ ප්‍රායෝගිකව විදේශ භාෂා ඉගෙනීමට පවතින අභියෝග, ගැටලු හා ඒ සඳහා ගතහැකි විසඳුම් පිළිබඳ ව වාග්විද්‍යාත්මක අධ්‍යයනයක්..... 60

සිංහල මව් භාෂිකයන් දෙවන භාෂාව ලෙස ඉංග්‍රීසි ඉගෙන ගැනීමේ දී මුහුණ දෙන ශබ්ද විද්‍යාත්මක හා ව්‍යාකරණමය ගැටලු පිළිබඳ ව තුලනාත්මක අධ්‍යයනයක් 61

නවකතා ඇසුරෙන් බිහිවූ ශ්‍රී ලාංකේය සිංහල වෘත්තාන්ත ටෙලි නාට්‍ය කලාව පිළිබඳ අධ්‍යයනයක් (ක්‍රි. ව. 1982 - ක්‍රි. ව. 2002 දක්වා විකාශය වූ නිර්මාණ ඇසුරෙන්)..... 62

අපරදිග නාට්‍ය කෘතිය මව සහ පුතු යන වර්ග ද්විත්වයේ නිරූපිත අන්තර් පුද්ගල ගැටුම පිළිබඳ ව අධ්‍යයනයක් (තෝරාගත් නාට්‍ය කෘති ඇසුරින්)..... 63

කැලණිය විශ්වවිද්‍යාලයීය විද්‍යාර්ථීන් හින්දි භාෂාව විෂයයක් ලෙස තෝරා ගැනීමේ ප්‍රවණතාව පිළිබඳ අධ්‍යයනයක්..... 64

මිනුම් ක්‍රම තහවුරු කරගැනීමෙහි ලා මඤ්ජුලි භාෂිතවාස්තු විද්‍යාශාස්ත්‍රාගත ෂඩ් වර්ගයෙහි දායකත්වය..... 65

විගාමික චිත්‍ර සාහිත්‍යය නිර්මාණකරණයෙහිලා කැලණිය විශ්වවිද්‍යාලයෙන් ලැබෙන දායකත්වය පිළිබඳ අධ්‍යයනයක්..... 66

ශ්‍රී ලාංකේය රූපවාහිනී මාධ්‍යයේ ඒකාංක ටෙලිනාට්‍ය පිළිබඳ විමර්ශනාත්මක අධ්‍යයනයක් (ආනන්ද අබේනායකගේ “සංසාරේ පියසටහන්” ඒකාංක ටෙලිනාට්‍ය ඇසුරෙන්)..... 67

Stress-free education during the fuel crisis in Batticaloa: Perspectives of teachers 68

A study about leadership challenges and issues faced by Sri Lankan state university libraries in the disruption era..... 69

The influence of child negligence on children's mental wellbeing..... 70

International trade in post-pandemic era: perspectives of growth, investment & supply chain in South Asia & Southeast Asia 71

The Growing unilateralism and the future of the Indian Ocean Region (IOR)..... 72

The humoral theory and human psychology in traditional medical systems of ancient Greek medicine and Ayurveda medicine..... 73

A close examination of the ancient contacts between Greece and Egypt with special reference to Greek and Egyptian foreign relations from the 7th to 5th centuries BCE..... 74

A study on streaming media as a method to overcome the current economic crisis in Sri Lanka: with special reference to YouTube content creations 75

Defining quality assurance in academic library perspective: a systematic review 76

බ්‍රිතාන්‍ය පාලන අවධියේ ස්වදේශික ජනතාවගේ සෞඛ්‍ය සේවා සහ රෝග නිවාරණය (ක්‍රි.ව.1796 සිට 1815 දක්වා)..... 77

පාස්කු ඉරැදින ප්‍රහාරයෙන් පසු ලාංකේය කිතුනු-ඉස්ලාම් අන්තර් ආගමික සංවාදය (මීගමු පුරවැසි එකමුතුව පිළිබඳ සිද්ධි අධ්‍යයනයක් ඇසුරින්)..... 78

මහනුවර යුගයේ රෝපිත ඓතිහාසික බෝධි වෘක්ෂ..... 79

ලාංකේය දේශපාලන බල ව්‍යුහය ආකෘතිය හා අලි-මිනිස් ගැටුමේ උභතෝකෝචිකය ගැටුමටදී න්‍යායික ප්‍රවේශයක් තුළින් ඥානවිමංසනය කිරීම..... 80

ශ්‍රී ලංකාවේ වත්මන් ආර්ථික අර්බුදය තුළ වැඩිහිටියන් මුහුණ දෙන සමාජ-ආර්ථික ගැටලු හා අභියෝග 81

2022 ගෝල්ෆේස් අරගලයේ ප්‍රවෘත්ති වාර්තාකරණය - රූපවාහිනී මාධ්‍යය ඇසුරෙන් විශ්ලේෂණාත්මක අධ්‍යයනයක්..... 82

Analytical study of syntactic errors of undergraduates in writing Hindi as a second language... 83

Science, Technology, Engineering and Mathematics

Protein-protein interaction network analysis for breast cancer biomarker identification using Cytoscape software 85

Green synthesis and detection of antioxidative, photocatalytic and antibacterial properties of silver nanoparticles synthesized from *Psidium* spp. Leaves extract..... 86

Investigation of toxic metals contamination status in red raw rice (Bg 350) grown in North Central province in Sri Lanka 87

An ecological approach for the green synthesis of silver nanoparticles using leaf extracts of six species of genus *Adiantum* and assessing their antibacterial, antioxidant and photocatalytic activity..... 88

Development of expanded graphite from vein graphite via electrochemical exfoliation with sodium sulfate as an electrolyte..... 89

Green synthesis of silver nanoparticles using five varieties of *Mirabilis Jalapa* flower extracts; evaluation of antioxidant, antimicrobial and photocatalytic activity 90

Green synthesis of silver nanoparticles using *Cinnamomum verum* leaf extracts and determination of their antioxidant, antimicrobial activity and photocatalytic activity..... 91

Identification of practical problems related to the use of emails as a means of communication in telework at institutions in Sri Lanka..... 92

Adsorptive removal of Cd (II) from aqueous solutions by sand/graphite oxide nano-composites: characterization, isotherm, and kinetic studies..... 93

Structural analysis of $\text{LiNi}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$, $\text{Li}_{0.96}\text{Na}_{0.04}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$ and $\text{Li}_{0.96}\text{K}_{0.04}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$ materials synthesized by Pechini method..... 94

In silico evaluation of coconut milk phenolic antioxidants and their metabolites by human gut bacteria..... 95

An overview of parametric and non-parametric gene selection methods in classification approaches in microarray data 96

Micro-textural features of heavy mineral beach placers along the southeastern coast of Sri Lanka: implications for their paleoenvironment	97
Investigating temperature dependence of lithium-ion diffusion through the silicon (111) surface	98
A comparison of food contamination by heavy metals/metalloids in CKDu prevalent areas and a reference area; A study in Sri Lanka	99
Prevalence of known diabetes in Sri Lanka: results from the Sri Lanka demographic and health survey 2016	100
Identification of potential inhibitors against prostate cancer metastasis drug target, human fatty acid binding protein-12: An <i>in silico</i> study	101
Identification of phytochemical inhibitors against papain-like protease of SARS-CoV-2: molecular docking, molecular dynamics and absorption, distribution, metabolism, excretion and toxicity (ADMET) study	102
Larvicidal and pupicidal activity of <i>Trichoderma longibrachiatum</i> (Tl-AgNPs) and <i>Trichoderma viride</i> (Tv-AgNPs) mediated silver nanoparticles against dengue vector <i>Aedes aegypti</i>	103
Identification of carbazole alkaloids from <i>Murraya koenigii</i> as potential main protease inhibitors of SARS-CoV-2 Omicron variant	104
Methylene blue adsorption on coconut vinegar activated wood biochar	105
Identifying cost-effective techniques for commercially growing <i>Eruca sativa</i> plants using the Nutrient Film Technique (NFT)	106
Introducing an ED-CdTe nucleation layer on the CBD-CdS layer in solar cell fabrication	107
Tuning the carboxylic groups and increasing the number of defects in graphene oxide nano sheets by changing the oxidation duration of modified Hummers method	108
An investigation on the sensory quality parameters of cookies incorporated with coconut testa flour	109
<i>In silico</i> study of physicochemical, pharmacokinetic, toxicity, metabolism and molecular docking of aristolactam E, a constituent of <i>Aristolochia elegans</i> Mast	110

Distribution of leishmaniasis cases and some demographic characters of patients recorded in the Medirigiriya medical officer of health (MOH) area, Polonnaruwa district of Sri Lanka	111
Metagenomic analysis of the effect of coconut milk on the colon microbiota.....	112
Application of rolling circle amplification (RCA) to detect direct amplification of dengue virus in patient serum samples.....	113
Effect of the wet extraction methods on the phenolic profile of coconut oil.....	114
Effect of coconut milk on intestinal barrier function and management of oxidative stress	115
Addition of two <i>Trichoderma</i> species with organic fertilizer paste - A boon for crop yield of <i>Abelmoschus esculentus</i> L. cv. MI 5	116
Author Index.....	117

**Accounting,
Business
and
Management**

Research facilitation for commercial agriculture sector in Sri Lanka on the key performance drivers: with special reference to the themes of ‘research for society’ and ‘economic gains’

Abeyasiriwardana P. C.^{1*}, Jayasinghe - Mudalige U. K.

Critical Success Factors (CSF) of a research institute, once prioritized strategically, possess the potential to drive its research culture towards innovation. In the context of the commercial agriculture sector in Sri Lanka (CAS), the most deliberated Key Performance Drivers (KPD) amongst the CSFs those focus on achieving the 2nd Sustainable Development Goal – ‘Zero Hunger by 2030’ include the ‘Research for Society’, ‘Commercialization’, ‘Technology Transfer’ and ‘Research Collaboration’. Taking into account the theme of ‘Research for Society’ on one side and the economic feasibility of research reflected by the rest of the themes of ‘Commercialization’, ‘Technology Transfer’ and ‘Research Collaboration’ capacities on the other, it was revealed that, in the face of resource scarcity resulting from a pandemic situation like COVID-19, research institutes working on CAS followed a nascent movement of trading-off these performance drivers in their research development process. The prime focus of this study was to examine empirically the previous studies on those KPDs and comprehend the key issues in cards and how could they be tackled sensibly in planning and undertaking a well-administered program of research to balance the socio-economic benefits of research outputs for the wellbeing of the sector. In this context, the perspectives of the ten (10) top administrators of those research institutes working on the CAS were analyzed by creating 119 codes on those data which were collected by way of a series of semi-structured questionnaire-based personal interviews using Thematic Qualitative Models generated through MAXQDA Software. The codes were then sorted, organized, renamed, merged, and deleted several times to synthesize five themes similar to above mentioned KPDs. The strengths and weaknesses associated with the current systems of performance management, particularly in developing a socially-responsible program of research that warrants the participation of now largely ignored rural communities as stakeholders were disclosed. How the KPD - ‘Research for Society’ can enhance the participation of this stakeholder group in the research development process with the support of digitally enabled performance management systems was much highlighted in the study. Further, the digitally-enabled key performance indicators (KPIs) to assist evidence-based decision-making to guarantee demand-driven research, as a remedy to overcome those performance concerns specifically mentioned in the crises like the COVID-19 pandemic, were ascertained. Since the results particularly implied encouraging stakeholder participation in research for innovative commercial agriculture, a new set of policies and management strategies such as promoting Artificial Intelligence (AI) and big data in modern PMS were recommended to systemize real-time stakeholder participation and collaborations in such research.

Keywords: Commercial agriculture, Digital transformation, Key performance indicators (KPIs), Performance management, Research culture

¹ pcabeyasiriwardana@wyb.ac.lk, Ministry of Education (Research and Innovation) and Wayamba University of Sri Lanka

* abeyasiriwardana@yahoo.com

Occupation stress and work-family conflict: A study in ABC Clothing (Pvt) Limited, Sri Lanka

Silva R. D.¹, Subhashi S.

In this modern work framework, numerous employees confront work-family conflict challenges. Work-family conflict is a circumstance where an individual faces incompatible demands from work roles and family roles. These days, employees spend more time on work and engage more in job responsibilities than family which leads to work-family conflict. One of the main reasons which emerge from work-family conflict is due to occupational stress. Increasing occupational stress contributes to lower productivity, industrial accidents, higher absenteeism, employee turnover, physical and mental health problems, and family problem. ABC Clothing (Pvt) Ltd is one of the leading apparel manufacturing companies in Sri Lanka that export clothing to the United States and Europe countries. Discussion with the Human resource manager found a high turnover rate and decrease in overall production when compared to the previous few years. As per the opinion of the counselor; long hours, work pressure, and workload as the main reasons which lead to stress among the staff. She also addressed the issue of domestic violence among employees as an effect of occupational stress. In addition, most of the workforce does not reside close to the workplace. As a result, they live in boarding houses or travel long hours which also became a reason for work-family conflict. Therefore, this study attempts to examine married employees' perspectives on occupational stress and work-family conflict. The purpose of the study is to determine the stressors and their impact on work-family conflict among married employees of ABC Clothing (Pvt) Limited, Dickwella, Sri Lanka. Questionnaires were distributed among 75 married employees to gather primary data. The researcher considered work-family conflict as a dependent variable which was measured using 8 items. Job demand, job appreciation, and role ambiguity were considered as dimensions of occupational stress. Each dimension was measured using 3 indicators; working hours, workload, and work pressure; financial benefits, non-financial reward, and recognition; job description, task instruction, and work expectation. Based on the analysis, 67% of respondents were women, and 33% were men. According to descriptive statistics, all job demand indicators show high mean values of 4.53, 4.23, and 4.21. It also found that employees are dissatisfied with job appreciation factors. Based on the multiple regression model, it revealed that, except for the job description, all the components of job stress are significant at the 0.05 level. It validates that a 1point increase in long working hours, workload, work pressure, poor financial benefits, poor non-financial reward, lack of recognition, lack of clarity in the job description, unclear task instruction, and work expectation leads to an increase in work-family conflict by 5.063, 3.078, 4.082, 1.432, .609, .362, .148, .073, and 3.685. Therefore, the organization needs to pay closer attention to working hours, workload, work pressure, and work expectations issues. It suggests that job duties and tasks should be clearly defined and should be made clear to the employees. Supervisors should provide clear instructions and guidelines on work expectations from employees.

Keywords: Occupational stress, Work-family conflict, Work pressure, Workload, Working hours

¹ SLIATE, ATI - Dehiwala, Sri Lanka
*romitadesilva4@gmail.com

Challenges and benefits of implementation of ISO 9001: 2015: The case of Department of Finance, University of Kelaniya, Sri Lanka

**Chathurika H. L. D. J.^{1*}, Abeysekera R., Perera L. A. S., Premarathne W. G. I. D.,
Chathurika H. L. D. J.**

Today, higher educational institutions are developing at a rapid pace by adopting new processes and technology. Further, they are subject to intense competition. Given this backdrop, higher educational institutions, in particular universities, are concerned about quality assurance. University Grant Commission, through Quality Assurance Council, gives the direction to maintain quality in Sri Lankan Universities. There has been a growing interest in adopting internationally reputed ISO 9001: 2015 by state universities in Sri Lanka that complement other quality measures. The Department of Finance (Dfin), University of Kelaniya, implemented ISO 9001: 2015 successfully recently. The objective of this study is to examine the challenges and benefits of the implementation of ISO by Dfin. A qualitative research approach using a single case study method was adapted to carry out the study. The findings of this study show that DFin implemented the ISO to gain a competitive advantage and reputation, and to establish a proper filing system. The study also reveals that lack of resources, resistance to change, and the existence of other quality measures challenged the implementation of ISO. The findings of this study contribute to knowledge and practice domains.

Keywords: Quality assurance, ISO 9001: 2015, Case study method

¹ University of Kelaniya, Sri Lanka
*jayanic@kln.ac.lk

Foreign direct investment and gross domestic products growth in Sri Lanka: An autoregressive distributive lag bounds test approach

Tharsika K.¹

In the middle of this year, a burning topic in Sri Lanka was the countrywide outbreak of protests, which the government is struggling to control. Sri Lanka's GDP growth is plummeting due to poor government policies and COVID-19 pandemic. As a result, the Sri Lankan government must devise a strategy to boost the country's GDP growth. Foreign Direct Investment (FDI) boosts the country's economic growth directly or indirectly, making it a vital tool for economic reform in this globalization era. FDI is particularly important in helping developing countries accelerate their GDP growth. However, empirical evidence on the links between FDI and GDP growth is mixed. As a result, this study aims to investigate the short and long-run relationship between FDI, net inflows (BoP, current million US dollars), and Sri Lankan GDP growth. The study used annual time series data from the World Bank and central bank annual reports from 1981 to 2020 to examine the research puzzle. The Augmented Dickey Fuller (ADF) unit root is used to investigate the stationarity properties of the two selected variables. The ADF unit root test results demonstrate that neither of the study variables of GDP and FDI is stationary at the 2nd difference. In addition, both variables are integrated in a mixed order of at level and 1st difference. The results support the eligibility of the ARDL model application for this study. The ARDL bounds test result concludes that there is a long-run relationship between the FDI and GDP growth in Sri Lanka. Further, the error correction model proves a short-run causality between selected variables. Thus, this study's findings show a short and long-run relationship between the variables studied. The results of this study provide implications to policymakers and governments in designing appropriate policies for encouraging FDI within countries, which indirectly boosts economic growth.

Keywords: Autoregressive distributive lag, Bounds test, Foreign direct investment, Gross domestic products growth, Unit root test

¹ Department of Accounting, University of Jaffna, Sri Lanka
*tharsik@univ.jfn.ac.lk

The role of ethics in human resource management

Mithulan R.¹

The concept of ethics is imbibed within an individual to identify what is right and what is wrong to act accordingly. Such ethics is increasingly considered as a crucial element to embed in each function of Human Resource Management (HRM) to deal with the affirmative moral obligations of the organization towards its employees to maintain equity and equality. Ethics in HRM indicates the treatment of employees with ordinary decency and distributive justice. Incorporating ethical principles and values in HRM practices empowers an organization to maintain and increase trust. However, the impact of ethical violations on HRM within an organization can be enormous. In particular, it can create negative influences on individuals, businesses, stockholders, and society as a whole. Moreover, it may adversely influence the HRM practices, the organization's financial stability, and the competitive position. Thus, this paper attempted to systematically review the literature on ethics and HRM to better understand how ethics and HRM are connected with the business context, and to propose the implication of the review's findings. The author formulated this paper by reviewing existing literature on ethics and HRM and practicality in the business organization. The organization of this study was designed based on theory and practical linkage. The objectives of this conceptual paper were (1) to determine the importance of ethics in the functions of HRM; (2) to reveal the concept of Ethics and HRM linkages in the business context; and (3) to propose some implications of the findings in the way that will contribute theoretically and practically. Further, resource-based review base view is used as the underpinning theory which further explains the importance of ethical embedded HRM for the competitive edge. Generally, this article supports the statement that ethical oriented HRM contributes to the profitability and competitiveness of an organization. It also further supports organizational sustainability.

Keywords: Acquiring, developing, Ethics, Ethical eEmbedded human resource management, Human resource management, Retaining

¹ University of Jaffna, Sri Lanka
*renusha@univ.jfn.ac.lk

Computing and Digital Learning

Freshmen's perceptions of blended learning in higher education; A case of University of Colombo Institute for Agro-Technology and Rural Sciences

Siriwardena B. P.^{1*}, Abeywickrama L. M., Sandika A. L., Vidanapathirana N. P.

Global teaching and learning methods have evolved substantially in recent years, where a paradigm shift from traditional face-to-face learning to hybrid systems has been evident in several nations. Accordingly, hybrid systems such as blended learning has been introduced to the Sri Lankan education system in the past years. In many countries, holistic techniques have shown that it is the most efficient system. The objective of this study is to investigate freshmen students' perception of blended learning in Sri Lanka. The study was conducted at University of Colombo Institute for Agro-Technology and Rural Sciences, one of the major institutes in Sri Lanka that have been implementing blended learning for undergraduate students for several years. The population for the study was chosen among the undergraduates in their first year at the institute. A sample was chosen using a simple random sampling procedure, with a sample size of 100. To determine the association with the dependent variable (perception of undergraduates), distinct dimensions were chosen for each independent variable (student-instructor interaction, resources in course modules, and completion of course objectives). To obtain primary data, a pre-tested questionnaire was administered using the institute's Learning Management System. Secondary data were gathered from previously published publications. The data were then analyzed using the SPSS (26) statistical software suite. The results for selected constructs were analyzed using reliability analysis, correlation analysis, and significance values. The reliability levels of the various variables are all acceptable. Selected variables; student-instructor interaction, resources of the course module, and completion of course objectives exhibited a strong positive correlation with undergraduate perception.

Keywords: Blended learning, Freshmen, Instructor, Perception and undergraduates

¹ University of Kelaniya, Sri Lanka
* buddhika@uciars.cmb.ac.lk

Shard-based blockchain into social media platforms

Thanujan T.^{1*}, Madhubhashani N. H. A. C., Rishan R. M., Wasana P. P., Gunasekara H. P. P.T.

In this era, social media platforms serve as valuable communication media to form interaction and social awareness within a community. The reliability of social media depends on the data being shared and the trustworthiness of the participants' behaviour. With the growing scale of network participants in social media, confronting the credibility of the platform was identified as a huge challenge where the trustworthiness of the content is the prime factor. Moreover, with the exponential growth of network participants, the probability of spreading misleading content is expected to increase. The decentralization approach of blockchain technology into social media will enhance the trustworthiness of the content. Therefore, current study focusses on proposing a shard-based blockchain framework for social media platforms. The adoption of blockchain technology into social media is intended to ensure data integrity and consistency. Sharding is a technique to split the entire blockchain network into smaller partitions thus resolving the scalability issues by gaining the highest transaction throughput. Therefore, the entire network of participants was partitioned into shards based on similar interests such as sports, education and cinema. The consensus mechanism is the core of blockchain technology. A desk review of existing consensus mechanisms was conducted to select the most appropriate consensus mechanism. Among the mainstream consensus mechanisms, Federated Byzantine Agreement (FBA) was selected as the most suitable consensus mechanism. Despite the high scalability, the inherent infrastructure of quorum and quorum slice of FBA was optimum for sharding techniques. In the proposed architecture, the endorsement of FBA leads the participants to form their own shards based on their interests and mitigate the scalability issues in the validation process. Thus, the proposed architecture allowed reliable content through the validation of the respective field of interest shards, and the scalability is achieved through the common interest of participants via quorum intersections of the FBA. Moreover, a reputation-based control mechanism is proposed to improve the content's reliability. Thus, the proposed framework is expected not only to solve scalability issues but also to enhance the security and privacy of social media. The proposed conceptual architecture aims to establish an ethical democratic and reliable social media network in future.

Keywords: Social media, Blockchain, Sharding techniques, Consensus mechanisms and federated byzantine agreement.

¹ University of Kelaniya, Sri Lanka
* thanushyal@esn.ac.lk

Connectivism for improved learning outcomes in higher education in the digital age – A scoping review

Senadheera V.^{1*}, Muthukumarana C., Rupasinghe T., Ediriweera D.

In the current context, there is a substantial need to update instructional strategies used in higher education, to cater the learning needs of current learners, who are called as digital natives. Connectivism, which is a learning theory that intends to explain how learning occurs in the digital age, can be used to bridge the gap between instructional strategies and how learning occurs in digital natives. The objective of this scoping review was to examine how connectivism has been applied in higher education, describe the findings and to understand the impact of connectivism on the success of student learning in higher education. Nine databases were searched for eligible publications. SCOPUS, EBSCOhost, Emerald, JSTOR, Taylor and Francis, PubMed (MEDLINE), ERIC, ACM and IEEE Xplore were searched using the keyword 'connectivism'. The search retrieved 1560 records of which 24 articles were selected according to inclusion and exclusion criteria. Included studies which were published 2009 through 2022, were from 18 countries and represented 12 study fields including; language learning, education, medicine, and engineering. In reported studies, either connectivism has been applied alone or it has been combined with another learning theory to design teaching/learning activities. These studies predominantly have used the online mode (54%), followed by blended learning mode (25%) and face to face mode (21%). Among these studies, 67% have been intended to deliver skills such as; writing, teaching and work-based learning, and 33% have been intended to deliver both theory and skills such as; biostatistics, chemistry and pedagogical practices, while no study has been designed to deliver a theory alone. To evaluate the outcomes of the teaching/learning activities, 75% of the studies used qualitative approaches, 12.5% used quantitative approaches and 12.5% used mixed methods. According to the findings, 17% of studies have reported that, connectivist learning environment has exhibited a significant positive impact on the academic performance of students through the promotion of higher order learning activities such as; synthesizing information, creating new knowledge and applying. More importantly, it has resulted in an enhancement of several attributes of learners which are required in the current job market. Accordingly, 17% of studies reported enhanced creative thinking, 21% self-management of learning and 50% enhanced interactions with peers as outcomes of using connectivism to design teaching and learning. Bringing connectivism to higher education is a method to incorporate formal education into the learning needs of the digital age and it has the potential to offer improved learning outcomes for higher education students. These improved outcomes are more pronounced when connectivism is used to deliver skills (deliver functioning knowledge/ put knowledge into action) compared to when it is used to deliver theory (declarative knowledge/content knowledge). Overall, it can be concluded that the successful integration of principles of connectivism in skill related teaching has a positive impact on students' learning and promotes lifelong learning.

Keywords: Connectivism, Higher education, Outcomes, Digital age, Learning theory, Lifelong learning

¹ University of Kelaniya, Sri Lanka
*vindyasenedheera@gmail.com

ICT aided skill enhancement for moderately hearing-impaired youth

Nambuwasam S. G.^{1*}, Liyanage S. R., Yatigammana M. R. K. N.

Hearing impairment is a prominent sensory disability in the world. Baker et. al (2017) state that hearing-impaired persons account for over 5% from the world's population. Though moderately hearing-impaired youth have good eyesight, they have difficulty in reading and writing text-based content due to their inadequate hearing. The inadequate hearing negatively affects their education and makes them low literate and unemployed in the society. If hearing-impaired youth are literate in ICT, more employment opportunities will be available for them in the industry such as graphic designers, computer hardware technicians, etc. Current study focusses on the development of e-learning materials for hearing impaired youth to improve their ICT literacy and competency in order to enhance their employability. We also attempt to identify a suitable methodology to develop e-learning materials targeting moderately hearing-impaired youth to provide ICT literacy skills. The aim of the research addresses the ICT related vocational training of moderately hearing-impaired youth through the development of ICT literacy skills. The research objectives are to identify learning theory, to determine a content development model, to design interactive e-learning material and to assess the applicability of the designed interactive e-learning material to provide ICT literacy for moderate hearing-impaired youth in ICT related vocational training. Based on the literature survey, Constructivism has been identified as a learning theory and the Learnativity content development model as a suitable content development model to provide ICT literacy for moderately hearing-impaired youth. Web based interactive e-learning material has been designed by incorporating text, graphics and audio to suit the requirements of the moderately hearing-impaired youth. A simple quiz is provided at the end of the interactive e-learning material to measure the participants understanding on the provided learning content. The sample participants will be selected using the random sampling technique to test the designed interactive e-learning material. Data will be gathered from the observations, questionnaires and interviews. Participants' feedback on their interactive e-learning experience is collected using the questionnaire and the interviews. Collected data will be analyzed using a statistical package. Results obtained after analyzing the data will be used to determine the applicability of the interactive e-learning material to provide ICT literacy for moderately hearing-impaired youth. Providing e-learning opportunities to be literate in ICT for moderately hearing-impaired youth is vital because the general education and vocational training of hearing-impaired learners has been drastically affected by the pandemic and the economic crisis of the world.

Keywords: e-Learning, hearing impairment, ICT literacy, Moderately hearing-impaired youth, Vocational training of hearing-impaired youth

¹ University of Kelaniya, Sri Lanka
*surini.nambuwasam@gmail.com

Impact of mobile application data usage on energy consumption

Arambepola N.¹

Energy crisis has become a buzzword at present due to the fact that people are experiencing the first global energy crisis. On the other hand, “Affordable and Clean Energy” is one of the key sustainable development goals (SDG) proposed by the United Nation to achieve by 2030. SDG can be achieved through different approaches. As modern society is moving forward with a digital world through novel technologies, one promising way of achieving SDG is Sustainable Human-Computer Interaction (SHCI). Mobile devices are the most used digital device category by every human regardless of any demographic factor. Therefore, in the modern world, a significant amount of energy is consumed by mobile devices because people tend to establish and maintain their daily routines through mobile applications. In this research, first we systematically reviewed twenty-four (24) research papers to investigate and to analyze the mobile application usage patterns and statistics. At the initial stage, research articles were collected through mainly five (05) databases: Google Scholar, IEEE Xplore, Scopus, ACM Digital Library, and ResearchGate. Previous research studies have identified the most demanding mobile application categories by the time that research was conducted. However, the validity of those findings for today is questionable due to the rapid advancements of mobile technology over the past few years. Thus, grey literature such as statistical reports was referred to study up-to-date information as this is a rapidly updating research area. Games, Health and wellness, Grocery, Education, and E-Learning apps are found to be the most demanding mobile application categories in the world today. Moreover, data demand has been considered a proxy for energy consumption. Data demand depends on various factors such as the size of the mobile app, service provided by the app, user behavior, etc. Among them, the patterns of smartphone users are a key factor that causes the changes in the data demand. However, recent findings have shown that the behavior of smartphone usage is driven by the service and the information required for the user, not by the technology. This is a vital motivation to introduce lightweight mobile apps to address the sustainable energy issue by reducing the data demand of mobile applications that are used in daily practices. It is a common fact that mobile apps are designed for the broadest audience, and expect they work well with all users. This may indirectly consume more data and energy. For example, a heavy mobile app may have a diverse range of functionalities, but one may never use at least half of them. These applications can be redesigned in a better way to save energy and to use effectively for specific user groups.

Keywords: Interaction design, Mobile applications, Data demand, Mobile application designs, Sustainable human computer interaction

¹nimasha_2019@kln.ac.lk, University of Kelaniya, Sri Lanka

Medical Sciences

Value of multimodal instruction on improving procedural skill proficiency among medical undergraduates: A study from a Sri Lankan medical faculty

Kodikara K. G.^{1*}, Seneviratne H. M. T. W.², Premarathna B. A. H. R.³

Acquisition of basic procedural skills is important for the medical students to practice as clinicians. Traditionally, such skills were taught or acquired by medical students at the bedside in the hospital setting during their clinical attachments. Skills laboratory training has been introduced to mitigate the ethical issues arising from practicing invasive procedures with inadequate training. The aim of the present study was to evaluate the effectiveness of simulation-based training and bed-side teaching for skill acquisition in the domain of procedural skills. Volunteer second-year medical students participated in this longitudinal cohort study. All participants rated their self-confidence and competence in performing venipuncture on a real patient (baseline). Afterwards, all the students underwent a simulation-based training (SBT) session followed by four-weeks of bed-side teaching/learning (BST) during clinical attachments in the hospital setting. The students rated their self-confidence and competence in performing venipuncture on real patients following simulation-based training and clinical training. Similarly, an independent assessor who was blinded to the study design scored the student's performance following each method of training using the Integrated Procedural Protocol Instrument (IPPI). Simulated patients and real patients assessed the communication skills of the students using a Communication Assessment Tool (CAT) following the skills-lab training and clinical training respectively. A sample of 55 students included in the study. Majority were females (63.64%,35/55). The self-assessment ratings of both the confidence and competence of students were significantly higher following the simulation-based training ($p < 0.01$). A further increased in both self-competence and confidence ($p < 0.01$) was observed with the clinical training following simulation-based training. The independent assessment showed a significant increase of means across all categories of IPPI ratings (mean SBT: 2.35; mean BST: 2.78; $p < 0.01$). Student's doctor-patient communication skills were rated significantly higher by real patients in the clinical setting when compared with the ratings given by simulated patients (mean SBT: 2.46; mean BST: 3.76; $p < 0.01$). This study confirmed the effectiveness of simulation-based training in procedural skill acquisition. A significant improvement in technical and communication skills as well as self-confidence and competence were observed following clinical training. This study demonstrated that simulation-based training compliments the bed-side learning and that a mix of these teaching/learning modalities substantially augments the clinical performance of medical students. A multimodal instruction for developing procedural skills can be recommended for undergraduate procedural skills training.

Keywords: Procedural skills, Simulation, Bed-side teaching, Skills lab, Medical education

¹ k.kodikara@kln.ac.lk, Department of Medical Education, Faculty of Medicine, University of Kelaniya, Ragama, Sri Lanka

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

³ Department of Medicine, Faculty of Medicine, University of Kelaniya, Ragama, Sri Lanka

Procedural experience, confidence, and self-reported perceived competence among medical undergraduates: A study from a metropolitan university in Sri Lanka

Kodikara K. G.¹, Seneviratne H. M. T. W.², Premarathna B. A. H. R.³

Bedside procedures are a vital component of patient care. Evidence from medical schools across the world reveals a lack of exposure to bedside procedures among medical undergraduates. Our objective was to ascertain medical students' experience, confidence, and competence in performing bedside procedures. An anonymous, electronic survey was conducted among medical undergraduates of the Faculty of Medicine, University of Kelaniya, Sri Lanka. The participants were from years three to five, who are engaged in clinical clerkships. Students were asked how often they were exposed to 20 common medical procedures, their anticipated level of self-confidence, and assumed self-competence in performing the procedure independently. Statistical analysis included student t-test, Chi-square test, and comparisons of means. In total, 178 students out of 250 replied to the questionnaire. Most respondents had not observed airway manoeuvres (48.8%), arterial puncture (44.3%), defibrillation (50%), paracentesis (55.6%), and trauma primary survey (56.1%) during their clinical attachments. Students were not confident to perform several bedside procedures either independently or under supervision: nasogastric tube insertion (91.5%), blood culture (69.6%), lumbar puncture (96.0%), cardiopulmonary resuscitation (59.5%), arterial puncture (85.9%), wound dressing (80.8%), and paracentesis (96.0%). Venipuncture, cannulation, and Foley catheter placement were the only procedures that greater than 50% of students had performed more than 5 times during their clinical attachments. Respondents assumed they were able to perform venipuncture (32.5%), cannulation (19.1%), and Foley catheter insertion (13.4%) independently. A significant correlation was observed ($r = 0.8$) with higher experience, confidence and assumed competence. The present study demonstrates that medical students are underexposed to vital bedside procedures and feel uncomfortable performing such procedures. Level of experience appears to significantly improve the levels of confidence as well as self-reported perceived competence among medical students. Due diligence needs to be given to improve procedural competence in undergraduate medical education.

Keywords: Procedural skills, Experiential learning, Confidence, Medical students, Medical education

¹ k.kodikara@kln.ac.lk, Department of Medical Education, Faculty of Medicine, University of Kelaniya, Ragama, Sri Lanka

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

³ Department of Medicine, Faculty of Medicine, University of Kelaniya, Ragama, Sri Lanka

Who teaches basic procedural skills: perspectives of medical undergraduates in a university in Sri-Lanka

Kodikara K. G.¹ , Seneviratne H. M. T. W.², Premarathna B. A. H. R.³

Learning procedural skills as a medical undergraduate has come a long way, as task trainers and simulators are now omnipresent. However, wide variations in procedural competence is observed among graduating doctors and medical students. Whether skills laboratory training has superseded bedside teaching or is adjunct to it, is an ongoing investigation. Furthermore, who is responsible for student education in the procedural skills domain, and how students learn in the current context are yet unclear. In this study, we sought to characterize the experience and opinions of medical students on procedural skills training. Six focus-group interviews were conducted among medical students who were undergoing clinical training, at the Faculty of Medicine, University of Kelaniya, Sri Lanka from July-October 2020. The interviews were recorded, transcribed, and analyzed for recurring themes. There were 18 third-year medical students, 17 fourth-year students, and 16 fifth-year students. Two focus group discussions were held per student from each academic year. Opinions on the learning environment, and learning methods for basic procedural skills, as well as who serves as the primary teacher, emerged prominently from the data. Third-year students reported simulation as the primary method of education. Bedside learning emerged prominently among fourth and final-year students. At the bedside, most students learn procedures through observation of health professionals. Nursing officers and intern medical officers were recognized as primary teachers by third and fourth-year medical students, whereas intern medical officers and registrars were identified as the primary teachers by the final-year medical students. The majority appreciated the skills laboratory training in developing procedural skills. Peer-assisted learning emerged prominently among discussions with all three academic years as a preferable mode of honing procedural competence among medical students. This study suggests that medical students recognize the utility of both simulation and bedside teaching in procedural skills training. They valued the contribution of nursing officers, interns, and registrars in their education. The student opinion varied in the degree to which they think simulation is or should be incorporated into learning procedural skills. Students visualize the capacity peer-assisted learning holds in improving procedural competence among medical undergraduates.

Keywords: Procedural training, Competence, Bed-side teaching, Skills lab, Medical education

¹ k.kodikara@kln.ac.lk, Department of Medical Education, Faculty of Medicine, University of Kelaniya, Ragama, Sri Lanka

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

³ Department of Medicine, Faculty of Medicine, University of Kelaniya, Ragama, Sri Lanka

Entomological and epidemiological investigations in a newly established focus of cutaneous leishmaniasis in Kegalle district, Sri Lanka

Wickramasinghe K.¹, Wijerathna T.^{2*}, Gunathilaka N.², Perera A.¹, Bandara S.¹

Leishmaniasis is a protozoan infection transmitted by phlebotomine sand flies. The published information on the vector distribution, abundance and potential risk factors that are favorable for disease transmission in Kegalle district are not available. Hence, understanding the trends in disease establishment, epidemiological characteristics, and the bioclimatic suitability of the area for disease prediction. The total number of leishmaniasis patients notified in Kegalle district and Sri Lanka from 2016-2020 was obtained from the Epidemiology Unit, Sri Lanka. Rambukkana and Warakapola Medical Officer of Health (MOH) areas that have reported the highest numbers of cases from 2016 – 2018 in Kegalle district were selected as the study sites in the current study. Patients were visited and socio-economic, demographic, environmental and awareness-related information was collected using an interviewer-administered questionnaire. A randomly selected household with no records of CL in the same locality of the patient household was included as the control group to match the case group at a 1:1 ratio. Entomological surveys were conducted from July 2019- July 2020 using standard entomological techniques. Bioclimatic suitability was evaluated using ecological niche modeling (ENM). A total of 107 patients were reported from Rabukkana and Warakapola MOH areas from 2016-2020. Of them 88 were traced and included in the study. The risk factors were assessed using the chi squared test at 95% confidence intervals. Age was divided into ten-year age groups for analysis. The findings indicate that leishmaniasis in the Kegalle district progressed to the outbreak level within 3 years since the first recorded case in 2016. School students (n=22, 25%, P<0.05) and individuals between 11-20 years of age (n = 33, 37.5%, P<0.05) were identified as the main risk groups. The presence of composting sites (n=65, 73.9%, P<0.05) that provide potential breeding grounds for sand flies, abandoned lands (n=63, 71.6%, P<0.05) which are potential diurnal resting sites of adult sand flies, and suboptimal (dark or normal) lighting conditions (n=87, 98.8%, P<0.05) in the house that may facilitate vector activity were denoted as significant risk factors for leishmaniasis occurrence compared the control group. The level of awareness of the disease was poor in both the test and control groups. Ecological niche modeling revealed that the areas closer to the Kurunegala district, a predominant leishmaniasis endemic district in the intermediate zone, have high bioclimatic suitability for leishmaniasis. The sand flies including, *P. argentipes* (n=121, 42%) and *S. zeylanica* (n=164, 56.9%) were present in high densities in this area. Hence, the control efforts focused on raising awareness, while implementing vector control and effective case management, prioritizing the high-risk areas is vital.

Keywords: Leishmaniasis, Patients, Sand flies, Risk factors, Ecological niche modelling

¹ Regional Director of Health Services Office, Kegalle District, Kegalle, Sri Lanka

² Department of Parasitology, Faculty of Medicine, University of Kelaniya, Ragama, Sri Lanka

*t.wijerathna@kln.ac.lk

Presence of leishmaniasis causing agent, *Leishmania donovani*, in biting midges (*Culicoides sp*) at a disease endemic area of Sri Lanka: Could it be a probable vector?

Wijerathna T. ¹, Wimalasiri U. ¹, Wijegunawardena A. ², Gunathilaka N. ^{2*}, Rodrigo W. W. P. ³

Biting midges are a group of dipteran insects of the family Ceratopogonidae. Some species of biting midges are known to be vectors for filaria parasites that infect humans, and some are known to be vectors of viruses that infect livestock. Evidence suggests that biting midges may be a potential vector for Leishmania parasites in other countries. Biting midges are found in high densities in leishmaniasis endemic regions of Sri Lanka. This high density and biting nuisance suggest that these insects may have a possible role as secondary vectors (if not primary vectors) for leishmaniasis in these areas. The first criterion of leishmaniasis vector incrimination is the detection of parasites from the suspected vectors. Therefore, the present study examined the Leishmania donovani parasites circulate within biting midge populations at a leishmaniasis endemic area in Sri Lanka. The study was conducted in Medawachchiya Medical Officer of Health area in Anuradhapura District, Sri Lanka. Biting midges were collected using cattle baited net traps during December 2021. The collected specimens were identified using morphological identification keys. The specimens were surface sterilized using 70% ethanol and the DNA was extracted from the fly using MightyPrep reagent for DNA (Takara, Japan). The parasite DNA was detected using a Polymerase Chain Reaction (PCR) using Leishmania donovani specific primers that target kinetoplast minicircle gene. The amplicons were visualized under UV light after running on a 2% agarose gel stained with ethidium bromide. A total of 42 biting midges were collected and all of them were females. The collection consisted of a single species similar to Culicoides imicola in morphology. The gel electrophoresis and subsequent UV visualization indicated that two of the samples were positive for L. donovani DNA indicating a parasite circulation rate of 4.76% within the wild biting midge population. The results of the current study suggest that the L. donovani, the main causative agent of leishmaniasis in Sri Lanka, circulates within biting midge populations indicating a possibility of this species being a vector for leishmaniasis in Sri Lanka. According to the World Health Organization (WHO) criteria for leishmaniasis vector incrimination, the detection of the parasites within the insect is the first step. Further studies to assess the luxuriant growth of the parasite within midge midgut and experimental transmission using animal models are needed to confirm the vector status. Considering the medical and veterinary importance, the studies on biting midges of Sri Lanka are recommended.

Keywords: Leishmania, Parasites, Biting midges, DNA, Vector

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

² Department of Bioprocess Technology, Faculty of Technology, Rajarata University, Sri Lanka

³ Department of Zoology, Faculty of Natural Sciences, Open University of Sri Lanka

*n.gunathilaka@kln.ac.lk

The impact of the current crisis on patient attendance at Gynecology Clinic of Gampaha Wickramarachchi Ayurveda Teaching Hospital - Yakkala

Tharangani W. A. S.^{1*}, Wakkumbura H. P.¹

The sudden inflation of the country followed by the Covid-19 pandemic has affected almost all areas of the human life and it has been a burden for women seeking medical assistance for various diseases. The prevalence of gynecological disorders including subfertility, polycystic ovarian syndrome, fibroid and menstrual problems like endometriosis, irregular menstruation, amenorrhea have been increased in the present society and which is reflected by increased attendance for the Gynecology clinic of Gampaha Wickramarachchi Ayurveda Teaching Hospital - Yakkala (GWATH). The distinctive changes of the dietary and lifestyle patterns along with environmental factors could be considered as primary elements triggering these ailments. Apart from those causes, current economic and pandemic situation in the country have negatively affected not only for physical but also for psychological health of women. The main objective of this study was to identify the impact of economic crisis followed by Covid-19 pandemic on the prevalence of the gynecological disorders. Data was collected from the patients' record book of Gynecology clinic, GWATH from January 2018 to July 2022. Comparing the patients' attendance on each diagnosis which was taken as a percentage with respect to the total patient count in 2018, prevalence was decided and depending on that the impact of the crisis situation was inquired. Mean values (MV) of the patient count in each year was considered to compare the total attendance of the patients. The calculated MV of the total patient count in each year from January 2018 to July 2022 (2018MV-177.5, 2019MV-152.1, 2020MV-61.5, 2021MV-40.7 and 2022MV until July-58.0) showed that the attendance of patients to the clinic has clearly been decreased compared with pre-crisis in 2018. Furthermore, it was an obvious finding that the prevalence of disease conditions like endometriosis (2018-15.8% and 2020-6.1%) and polycystic ovarian syndrome (2018-21.3% and 2020-9.4%) has been decreased. On the other hand, the prevalence of female subfertility (2018-5.7% and 2020-25.2%), irregular menstruation (2018-6.7% and 2020-14.7%) and male subfertility (2018-4.9% and 2020-7.0%) has noticeably increased even though the total attendance of the patients has been decreased. By the increased prevalence of the patient count for subfertility and irregular menstruation, it can be assumed that the crisis situation has impacted on the psychological health of the patients where increased stress can be considered as a major factor for increased incidence of those conditions. In addition, it is also concluded that insufficiency and higher cost of the western medicines during the crisis situation, people have opted for seeking Ayurveda medicines.

Keywords: Economic crisis, Prevalence, Female and male subfertility, Irregular menstruation, Psychological health

¹ Gampaha Wickramarachchi University of Indigenous Medicine, Yakkala, Sri Lanka
*19shanika91@gmail.com

The impact of the economic crisis on patient attendance at Pediatric Clinic of Gampaha Wickramarachchi Ayurveda Teaching Hospital - Yakkala

Tharangani W. A. S.^{1*}, Wakkumbura H. P.¹

Sudden economic crisis followed by Covid-19 pandemic has affected almost all population while increasing the cost of basic and secondary needs. The Pediatric clinic of Gampaha Wickramarachchi Ayurveda Teaching Hospital - Yakkala (GWATH) could be identified as a leading clinic amongst Ayurveda and Western Pediatric clinics which serves in the management of a considerable population of pediatric diseases. Main objective of this study was to observe the prevalence of pediatric diseases during crisis situation based on patient attendance at pediatric clinic of GWATH. The secondary objectives were to identify which pediatric disease conditions have become more prominent during the crisis situation in Sri Lanka. Data was collected from the patients' record book of Pediatric clinic, GWATH from January 2018 to July 2022. Percentages of patients' attendance on each diagnosis with respect to the total patient count with respect to 2018 were compared to determine the prevalence of each disease. Based on the mean values (MV) of the patient count in each year, the total patient attendance was compared. The calculated MV of the total patient count in each year from 2018 to July 2022 (2018MV-26.7, 2019MV-28.8, 2020MV-12.0, 2021MV-7.7 and 2022MV-15.3) showed that the attendance of patients to the clinic has been decreased after the crisis situation compared with pre-crisis in 2018. Considering the total number of patients attended the clinic, it was identified that the prevalence of Ratha roga, Skin disease, Developmental delay and Immune thrombocytopenic purpura (ITP) have been increased compared to pre-crisis situation even though the total attendance has been reduced. In 2018, the prevalence of above-mentioned diseases was 4.6%, 3.3%, 6.2% and 0.0% respectively. And in the year 2022 by month of July it has been 7.6%, 7.3%, 11.6% and 5.8% respectively. ITP has become the most obvious disease condition from all the pediatric disease diagnosis. More than 80% of disease diagnosis is based on non-communicable diseases (NCD). With the increase of the patient count in 2022 compared to 2020 and 2021 it is interpreted that nevertheless the economic crisis or the pandemic, people are willing to attend the clinic for their major health conditions in seeking Ayurveda treatments. ITP has become a novel major pediatric complication compared with 2018 which makes it obvious that people are seeking Ayurveda treatments for NCDs rather than CDs.

Keywords: Crisis situation, Covid-19 pandemic, NCDs, ITP, Ratha roga

¹ Gampaha Wickramarachchi University of Indigenous Medicine, Yakkala, Sri Lanka
*19shanika91@gmail.com

Timely intervention of Garbhani Paricharya to manage the increased tendency of gestational diabetes mellitus (GDM) (Garbhani Madumeha)

Perera H. A. R. P.^{1*}, Madugalle S.¹, Tharangani W. A. S.¹, Attanayake M. K. D. K.¹

There has been a marked increase in the prevalence of diabetes in Asia over recent years. Multi-ethnic studies have highlighted the increased risk of gestational diabetes mellitus among different Asian populations. Prevalence of gestational diabetes in Asian countries varies substantially according to the screening strategy and diagnostic criteria applied, and ranges from 1% - 20%, with evidence of an increasing trend over recent years. Diabetes prevalence (% of population ages 20 - 79) in Sri Lanka was reported as 11.3% in 2021, according to the World Bank collection of development indicators, compiled from officially recognized sources. Sri Lanka - Diabetes prevalence actual values, historical data, forecasts and projections were sourced from the World Bank in August of 2022. As per Ayurvedic view *Garbha vrudhhi* can be co-related with GDM as it is a condition where the abdomen will be increase in size excessively with increased perspiration and therefore the labor also gets difficult. The objective of this study was to estimate the increased tendency of GDM among pregnant women and to determine the timely intervention of *Garbhani paricharya*. In the methodology of this study, the Oral Glucose Tolerance Test (OGTT) levels of 446 pregnant women were collected during the first trimester of their pregnancy, who attended three antenatal clinics in Gampaha district as the subjective data and thereby tendency of GDM was determined in those pregnant women who attended the antenatal clinics from 2017 to 2021. Primary data regarding *Garbhani Madhumeha* and its prevention methods was collected from authentic books written in ancient times by Ayurveda authors. According to clinical data statistics, GDM percentages since 2017 to 2021 were 31.6%, 34.5%, 45.9%, 47.8% and 49.2% respectively which had shown that the tendency of GDM has been increased. Therefore, it could be suggested that timely intervention of *Garbhani paricharya* mentioned in Ayurveda classical texts should be recommended in which the use of herbs as home remedies are indicated especially turmeric powder, bee honey, *Attikka (Ficus racemose L.)* etc. Scientific analysis of this compound revealed that bee honey helps in maintaining regularity in all internal functions of the body. Accordingly, it is confirmed that these remedies have the capability of preventing the occurrence of GDM and improving the normal functioning of the pancreas. Research papers explained that they have unique properties that help to minimize or prevent GDM. *Attikka* has been used in the treatments of diabetes due to its antidiabetic effect. Ayurveda recommends the use of the combination of turmeric powder with bee honey and as a special dietary supplement, to eat *Attikka* nuts with coconut. Research papers confirm that the chemical constitutes of *Attikka* act as hypoglycemic which can be used in the prevention of GDM. So, it is justifying to use these as home remedies to prevent GDM, which is currently on the rise and it is recommended that the primary health care has to be strengthened while the prevention, early diagnosis, and treatment of GDM to be given priority.

Keywords: Gestational diabetes mellitus, *Garbhani madumeha*, Major complication of pregnancy, *Garbha vrudhhi*, *Garbhani paricharya*

¹ Gampaha Wickramarachchi University of Indigenous Medicine, Yakkala, Sri Lanka
*renuka@gwu.ac.lk

Presence of very small embryonic like stem cells (VSEL) in human semen; A novel finding

Wijebandara N. R. Y.^{1*}, Dissanayake D. M. A. B.¹, Wijesinghe P.¹

The presence of a very small, quiescent, and pluripotent population of stem cells termed as VSELS was first reported in 2006. Those cells are observed in various organs in the body including bone marrow, peripheral blood, endometrium, ovary, and testis so on. But their existence in seminal plasma has not been reported so far. To find out whether VSELS are present in human semen samples and, if so, study their characteristics and relationship with semen parameters. Semen samples were collected from sub fertile men and analyzed according to WHO guidelines. VSELS in seminal plasma were detected using Giemsa stain. The presence of cells with primitive germ cell properties was confirmed by GPR 125 expression and alkaline phosphatase activity. Very small (2-6 μm) and round cells population with a large nucleus and narrow rim of cytoplasm was observed in all semen samples. The mean (SEM) concentration of VSELS was 17.21 (4.42) m/ml. Two distinct populations of cells were identified according to their color intensity; VSEL dark and pale, 53% and 47% respectively. VSEL count was significantly high in oligozoospermic samples compared to samples with normal sperm count, 22.71 (5.89) vs 6.22 (1.81), $p < 0.05$. There was a positive correlation between VSEL and immature germ cells ($r = 0.759$, $p < 0.001$). Minor percentage of sub-populations positive for alkaline phosphatase activity (6.06 %) and expressing GPR 125 (5.56 %) were also observed. To the best of our knowledge this is the first report on the presence of VSELS in semen samples. Sub-population of cells with primitive germ cell properties would be a good source of stem cells for future studies on *in vitro* spermatogenesis.

Keywords: VSELS, Seminal fluid, Germ cells, *In vitro* spermatogenesis, Semen analysis

¹ Stem Cell Research Laboratory, Department of Obstetrics and Gynecology, Faculty of Medicine, University of Kelaniya
*jithu.bandara@gmail.com

Timely intervention of Garbhani Paricharya to manage the increased tendency of pregnancy induced hypertension (PIH) (Garbhani Atiraktachapa)

Perera H. A. R. P.^{1*}, Tharangani W. A. S.¹, Attanayake M. K. D. K.¹

According to data, nearly one-third of the Sri Lankan adult population is hypertensive. Pregnancy induced hypertension (PIH) is one of the most common causes of both maternal and neonatal morbidity, affecting about 5-8% of pregnant women. According to Ayurveda, *Athiraktachapa* is a major complication (*Teewra Upadrava*) in gestational period. As per Ayurvedic view, *Garbhani atiraktachapa* is due to increased *Vata and Pitta dosha* and it involves *Hridaya, Dasha dhamani, Sira, Ras raktvaha strotas, Manovaha strotas, Ras dhatu, Rakta dhatu* and *Mana as dushya*. The risk of PIH for both mother and the fetus will be higher comparing with other major complications during pregnancy as it would result in placental abruption, stroke, intravascular blood coagulation, organ failures for mother and intrauterine growth retardation, premature delivery, intrauterine death for the fetus. The objective of this study was to estimate the increased tendency of PIH among pregnant women and to determine the timely intervention of *Garbhani paricharya* to manage this condition. In the methodology of this study, measured blood pressure levels of 446 pregnant women were collected during the first trimester of their pregnancy, who attended three antenatal clinics in Gampaha district as the subjective data and thereby tendency of PIH was determined in those pregnant women who attended the antenatal clinics from 2017 to 2021. Primary data regarding *Garbhani Atiraktachapa* and its prevention methods was collected from authentic books written in ancient times by Ayurveda authors. According to clinical data statistics, PIH percentages since 2017 to 2021 was 11.3%, 14.2%, 15.8%, 17.5% and 19.4% respectively which had shown that the tendency of PIH has been increased. Therefore, it could be suggested that timely intervention of *Garbhani paricharya* mentioned in Ayurveda classical texts should be recommended in which it has been prescribed the behavioral regimen and medicine to control the occurrence of PIH. As an example, the decoction of *Gokshura (Tribulus terrestris Linn)* can be recommended from sixth month of gestational period and analysis of the chemical constitutes of decoction of *Gokshura* confirms that it has several PIH reducing compounds including diuretic, absorption enhancing, cardiogenic, hepatoprotective, anti-inflammatory, analgesic activities. The contra-indicated factors mentioned in Ayurveda which are known as *Garbhopaghatakara bhava* are the main etiological aspects that can be identified to provoke PIH therefore correct guidance of *Garbhani paricharya* will be needed to prevent this condition rather than curing. PIH prevalence has been increasing yearly so as per Ayurvedic recommendations, taking the decoction of *Gokshura* and following other necessary behavioral regimens by a pregnant woman can be mentioned as a successful solution to PIH.

Keywords: Pregnancy induced hypertension, Athiraktachapa, garbhopaghatakara bhava, Decoction of gokshura, Garbhani paricharya

¹ Gampaha Wickramarachchi University of Indigenous Medicine, Yakkala, Sri Lanka
*renuka@gwu.ac.lk

Body weight status and implications on kidney health of the pediatric communities in the dry climatic zone in Sri Lanka: A cross-sectional study

Gunasekara T. D. K. S. C.^{1*}, Silva P. M. C. S. D.¹, Chandana E. P. S.¹, Jayasinghe S.¹, Herath C.², Siribaddana S.³, Jayasundara N.⁴

Unhealthy bodyweight is associated with multiple clinical complications that serve as potential risk factors for kidney diseases. However, pediatric renal outcomes associated with the bodyweight status are not properly understood in many communities. Hence, the aim of this study was to assess potential associations of bodyweight status with renal health of selected pediatric communities in the dry climatic zone of Sri Lanka. This cross-sectional study was conducted with school students of both genders 13-16 years of age (N=326) in selected education divisions in dry zone regions where chronic kidney disease of uncertain etiology (CKDu) is not evident. Mid-stream early morning urine samples of the students were assessed for creatinine and albumin using an automated clinical chemistry analyzer. Quantitative assessment of urinary kidney injury molecule (KIM-1) and neutrophil gelatinase-associated lipocalin (NGAL) was based on enzyme-linked immunosorbent assay (ELISA). Age and gender-specific World Health Organization guidelines (LMS-based body mass index (BMI) percentiles), adopted by the family Health Bureau of the Ministry of Health, Sri Lanka, were used to assign the students into four BMI strata: underweight, normal, overweight, and obese. Urinary KIM-1, NGAL, and albumin creatinine ratio (ACR) were used as the criteria to interpret renal function. The median levels of biomarkers, NGAL, ACR and particularly KIM-1 which is a more sensitive indicator of renal injury, showed no significant difference across the four BMI strata in both girls and boys. Also, the median levels of the three biomarkers showed no significant difference between the girls and boys within the same age stratum. Furthermore, BMI did not significantly correlate with urinary KIM-1, NGAL, and ACR in the three age strata, while very weak correlation of age was observed with BMI. Our findings did not produce plausibly strong evidence to establish a potential link between bodyweight status and altered renal function in the studied dry-zone pediatric communities. However, longitudinal studies with increased sample size and broader age range are warranted to make more accurate interpretations on potential associations of longstanding unhealthy bodyweight with pediatric renal health in Sri Lanka.

Keywords: Body mass index, Pediatric, Kidney injury, Biomarkers, Sri Lanka, KIM-1, NGAL, ACR.

¹University of Ruhuna, Sri Lanka

² Sri Jayewardenepura General Hospital, Sri Lanka

³ Rajarata University, Sri Lanka

⁴ Duke University, The United States of America

*sameera.ac@live.com

Assessment of the distribution of *Aedes* breeding sites at the households of district of Gampaha

Perera E. H. L.^{1*}, Hapugoda M. D.¹, Viswakula S.², Gunawardene Y. I. N. S.¹, Subasinghe U.², Fernando L.³, Manamperi A.

Dengue is the most important mosquito-borne viral infection in Sri Lanka at present. Integrated Vector Management (IVM) targeting dengue vector mosquitoes has become the main disease control measure. The objective of this study was to assess the distribution of the *Aedes* breeding habitats in dengue high and low risk areas in the District of Gampaha where the second highest incidence of dengue reported during last 10 years. Negombo Medical Officer of Health (MOH) area was selected based high incidence of dengue cases reported in the District of Gampaha during last 10 years. A dengue high risk (Kurana East) and low risk (Udayarthoppuwa) Grama Niladhari (GN) divisions with similar geographical situation in the same MOH area were selected as study and control areas respectively. Standard larval surveillance was conducted randomly selected 150 houses in each site for 18 months (April, 2018-October, 2019). In the dengue high risk and low risk areas, the proportions of the larvae of *Aedes* species to the total larval collection were 34.19% (185/541) and 21.68% (147/678) respectively. High densities of *Ae. albopictus* larvae were reported in both high [171/185=92.4%] and low [141/147=95.92%] risk areas. *Ae. aegypti* was present in low abundance in both areas [High risk-7.56% (14/185) and Low risk- 2.72% (4/147)]. In the high-risk site, breeding sites of the *Ae. albopictus* larvae were reported as plastic buckets/barrels (55.19 %-154/279), waste plastics (35.15%-98/279), metal tins (3.94%-11/279) and tube wells (2.86%-8/279). In low-risk area, the majority of breeding sites for *Ae. albopictus* larvae was found in coconut shells (76.14%-201/264) and plastic waste (21.96%-51/264). In both areas, *Ae. aegypti* larvae was found in plastic buckets/barrels only. There is a significance difference between the *Ae. albopictus* breeding places in the dengue high and low risk areas (P=0.024). Although *Ae. aegypti* is considered as the major vector of dengue, *Ae. albopictus* was reported as the prominent dengue vector species in the high dengue risk area in the District of Gampaha. Even though, municipal council removes solid waste weekly, a large number of breeding sites are available at both areas. As there is a significant difference between *Ae. albopictus* breeding sites at the dengue high and low risk areas, it is essential to specifically focus on removal of breeding sites for successful vector control measure.

Key words: Breeding sites, *Aedes*, vector, Larvae, Larval surveillance

¹ Molecular Medicine Unit, Faculty of Medicine, University of Kelaniya, Sri Lanka

² Department of Forestry and Environmental Sciences, Faculty of Applied Science, University of Sri Jayewardenepura, Sri Lanka

³ Centre for Clinical Management of Dengue and Dengue Hemorrhagic Fever, District General hospital, Negombo

Study on the resting preferences of *Aedes aegypti* (Linnaeus) and *Ae. albopictus* (Skuse) adult mosquitoes in the district of Colombo

Perera E. H. L.^{1*}, Gunawardene Y. I. N. S.¹, Hapugoda M. D.¹, Ranathunge T.²,
Udayanga N. W. B. A. L.³

Aedes aegypti (Linnaeus) and *Aedes albopictus* (Skuse) are the world's most widely distributed mosquito species and, act as major contributors to many mosquito-borne diseases. Remarkable behavioral and ecological attributes make these mosquitoes as efficient vectors. Due to the behavioral and ecological plasticity of *Ae. aegypti* and *Ae. albopictus*, it has become a major limitation in vector control and disease management measures in Sri Lanka. The objective of this study was to determine key bionomics aspects, namely resting preferences of *Ae. aegypti* and *Ae. albopictus* in the District of Colombo. Three Medical Officer of Health (MOH) areas were selected for the current study based on previous dengue cases. The two high risk areas (Maharagama and Kolonnawa) and a low-risk area (Padukka) were selected as study sites. Adult mosquito surveillance was conducted in outdoor and indoor settings using a mouth aspirator for one year (November, 2019-October, 2020). Adult mosquito collection included the aspiration from all rooms within the home including furniture, behind hanging clothes and curtains, behind and around cooking utensils and from dark and humid places, where mosquitoes were found resting. A total of 658 *Aedes* adult mosquitoes were collected from both indoor and outdoor resting locations (total number of resting sites= 432). The most abundant vector species was *Ae. aegypti* (65.0%; n=428), followed by *Ae. albopictus* (35.0%; n= 230) in Maharagama and Kolonnawa MOH areas. The most and least abundant *Aedes* mosquito collection MOH areas were Maharagama 44.5% (n=293) and Padukka 23.2% (n=153), respectively. *Ae. aegypti* adult mosquitoes denoted an endophilic behaviors (97.1%; n=416), while *Ae. albopictus* denoted an exophilic resting behavior (81.30% n= 187). In terms of resting places, *Ae. aegypti* was mostly found in resting places such as bedroom (36.0%; n=154), kitchen (26.2%; n=112) living room (21.3%; n=91), and outdoor vegetation (1.4%; n=06). Meanwhile, *Ae. albopictus* was conducive to rest on the vegetation (50.4%; n=116), front of the house-external (23.8%; n=109). The highest percentage of *Aedes* mosquitoes were found resting on wooden surfaces in both indoor and outdoor sites (52.3%; n=344), followed by clothes/curtains (24.2%; n=159) and cement surfaces (17.0%). Resting behavior of vectors is an important fact since they are prerequisites to determine their role in disease transmission in endemic settings. This study revealed that the resting behavior varied between the two *Aedes* vector species, were *Ae. aegypti* adult mosquitoes denoted highly endophilic nature, while *Ae. albopictus* demonstrated exophilic behavior. In this study *Ae. aegypti* was mainly found resting in bedrooms, living rooms and kitchens and *Ae. albopictus* was found resting mainly among outdoor vegetation. The outcome of this study facilitates the relevant health authorities who engage with dengue control programs, to successfully eradicate the vector from resting sites.

Keywords: Anthropophilic, *Aedes*, Colombo, Vector, Resting site

¹ Molecular Medicine Unit, Faculty of Medicine, University of Kelaniya, Sri Lanka

² Department of Zoology, Faculty of Science, Eastern University, Sri Lanka

³ Department of Biosystems Engineering, Faculty of Agriculture and Plantation Management, Wayamba University, Sri Lanka

Virus infections in the exacerbation of asthma in children from a pediatric setting in Sri Lanka

Wijesooriya L. I.^{1*}, Perera P.², Sunil-Chandra N. P.¹

Acute exacerbation of asthma (AEA) is a potentially life-threatening condition, which is often precipitated by respiratory infections. Particularly in children, viral respiratory tract infections are a common cause of acute exacerbation of asthma. There are limited Sri Lankan data on the role of viruses in acute respiratory tract infections among children. However, there are no data related to the role of viral infections causing acute exacerbation of asthma in Sri Lankan children needing hospital admission. A case-control study was conducted at the university pediatric unit, North Colombo Teaching Hospital, Ragama, Sri Lanka. Children between 3-15 years, admitted with AEA were recruited for the study as cases, along with another 100 children with a history of asthma without exacerbation as controls. Each group consisted of 100 children. Sputum/throat swabs were tested for the presence of antigens to five common viruses causing upper respiratory tract infections namely, adenovirus, influenza A virus, influenza B virus, parainfluenza viruses (1-3), and respiratory syncytial virus using commercially available indirect immunofluorescence assay (D3 Ultra DFA Respiratory Virus Screening & ID Kit by The Diagnostic Hybrids, Inc, Athens, USA). This part of the study of collecting samples was done throughout the years 2019 and 2020. The mean age of cases was nine years and 9.5 years in the control group. There was no significant difference in the gender distribution between the two groups ($P > 0.05$). Sputum samples were collected from 78% of the cases, and the rest had throat swabs. Only throat swabs were taken from the children in the control group. Immunofluorescence was used to identify respiratory viruses. In cases, adenovirus, influenza A virus, influenza B virus, parainfluenza viruses, and respiratory syncytial virus were detected at 9%, 1%, 2%, 5%, and 3% respectively; in the control group, it was 2%, 1%, 1%, 5%, and 2%. There was a significantly higher detection rate of adenovirus in the cases compared to the controls ($P = 0.040$), but no significant difference was noted for other viruses. Children admitted with acute exacerbation of asthma were having significantly high infection rates with adenovirus compared to control groups. Hence, adenovirus infections seem to be an important causative factor for AEA. Other viruses identified from both cases and controls in the order of frequency were parainfluenza virus, respiratory syncytial virus, influenza B virus, and influenza A virus.

Keywords: Exacerbation of asthma, Viral infections

¹ Department of Medical Microbiology, Faculty of Medicine, University of Kelaniya, Sri Lanka

² Department of Pediatrics, Faculty of Medicine, University of Wayamba, Sri Lanka

*lakmini.w@kln.ac.lk

Imaging intra-abdominal abscesses; A pictorial essay

Siriwardana S. R.^{1*}, Ratnayake C. S.², Wijesooriya L. I.³

Intra-abdominal abscesses are collections of pus surrounded by a wall of inflamed tissues. They would be confirmed in detail by imaging. Familiarization with imaging would facilitate the correct diagnosis and timely management. This report describes the imaging findings of five such cases. Case 1: A 61-year-old woman presented with low-grade fever and right lower chest pain. Abdominal ultrasonography showed a localized, thick-walled collection with copious, echogenic material at the right upper-posterior hypochondrium adjacent to segment VI of the liver. Contrast-enhanced CT (CECT) showed a thick-walled cystic lesion (28mm x 24mm x 25mm) at the same location. The collection laid outside the liver capsule causing indentation of the liver parenchyma. The lesion was diagnosed as a perihepatic abscess. Case 2: A 55-year-old man presented with fever, anorexia, and right-hypochondrial pain. Ultrasound abdomen showed a large, unilocular cyst with echogenic material and CECT detected a unilocular, well-defined and low-attenuated lesion in the right lobe of the liver. The arterial phase showed an enhancing cyst wall with a low-attenuating peripheral rim due to parenchymal oedema. This “double target sign” favored the diagnosis of abscess rather than cystic metastasis. Differential diagnoses were made as pyogenic or amoebic liver abscess and drained via an ultrasound-guided pig-tail catheter. Case 3: A 35-year-old woman presents with a high fever, continuous right lower abdominal pain, nausea, and vomiting for four days. The clinical diagnosis was made as acute appendicitis. Abdominal ultrasonography identified a localized fluid collection with surrounding echogenic fat in the right iliac fossa that was diagnosed as a localized abscess probably due to the ruptured appendix. CECT abdomen detected a thick-walled fluid collection with internal gas locules inferior to the caecum. The wall of the collection was enhanced with contrast. A partially collapsed appendix adjacent to the collection and surrounding inflammatory fat stranding were noted. The lesion was diagnosed as a ruptured appendix. Case 4: A 72-year-old female with uncontrolled diabetes mellitus presented with fever and right flank pain. Her abdominal examination revealed a significant right-sided renal angle tenderness. Ultrasonography showed right-sided pyelonephritis complicated with a perinephric abscess. CECT abdomen showed an enlarged right kidney with low renal cortical contrast enhancement and a perinephric abscess, abutting the psoas muscle. CT diagnosis was made as acute pyelonephritis complicated with a perinephric abscess. Ultrasound-guided drainage was performed. Case 5: A 72-year-old female with uncontrolled diabetes mellitus presented with fever and right hypochondrial pain. Ultrasonography showed a thick-walled gallbladder with internal sludge associated with adjacent fluid collection. CT-abdomen showed a thick enhancing gallbladder wall with an adjacent abscess. In conclusion, ultrasonography plays an important role in diagnosing a variety of intra-abdominal abscesses. Still, the CT-abdomen better characterizes the diagnosis. However, ultrasound-guided aspiration of intra-abdominal abscesses has become an important intervention in diagnosing and managing these patients.

Keywords: Intra-abdominal abscesses, Ultrasonography, Computer-tomography

¹ Department of Anatomy, Faculty of Medicine, University of Kelaniya, Sri Lanka

² University Medical Centre, University of Kelaniya, Sri Lanka

³ Department of Medical Microbiology, Faculty of Medicine, University of Kelaniya, Sri Lanka

*shrmsiriwardana@kln.ac.lk

A descriptive study on infections acquired in an intensive care unit of a secondary healthcare center in Sri Lanka

Madhusankha A. T.^{1*}, Iddamalgodha H.¹, Jayawardana G. P. C.², Karunasekara H. C. I.², Wijesooriya L. I.¹

Nosocomial infections are a substantial burden, particularly in patients admitted to intensive care units (ICUs). Present study was aimed to find the incidence, risk factors, and associated mortality of ICUAIs. A descriptive cross-sectional study was conducted among patients who were admitted to the ICU of Base Hospital, Wathupitiwala, Sri Lanka for three months from April-2019. A total of 250 patients who were admitted to ICU or readmitted 72 hours after discharge from the ICU were included. Demographic data and risk factors for infections were gathered from bed-head tickets. Microbiological screening samples were cultured to identify infections on admission to ICU. Screening-negative patients underwent repeat sampling for culture and antibiotic sensitivity testing (ABST) on each 3rd day of ICU stay. Of 250 patients, mean age was 57.08±17.65 and (52.8%) were males. Major indications for ICU admission were monitoring (50.4%) and ventilatory support (47.2%). Of the 250 patients, 34 patients (13.6%) were diagnosed with ICUAIs. Of the patients with ICUAIs, 35.29% were in 61-70 years. At least one risk factor was shown by 132 patients (52.8%). Those risk factors were; hypertension (OR=2.09, P= 0.06), bronchial asthma (OR=1.26, P= 0.60), epilepsy (OR= 3.29, P=0.20), ischemic heart disease (OR=1.52, P=0.39), and rheumatoid arthritis (OR=1.06, P=1.0), but they were not significant. Besides, ventilation (OR=4.31, P=0.0007) and continuous positive airway pressure (CPAP) (OR=3.57, P=0.001) were identified as risked procedures for ICUAIs. As per type of ICUAIs, respiratory tract infections (RTIs) were detected in 91.18% (31/34), followed by bloodstream infections (5.88% (2/34)) and urinary tract infections (2.94% (1/34)). Types of pathogens causing ICUAIs were *Acinetobacter* spp.-70.6% (24/34,) followed by *Escherichia coli*-11.8% (4/34), *Pseudomonas* spp.-8.8% (3/34), methicillin-sensitive *Staphylococcus aureus*-5.9% (2/34), and methicillin-resistant *S. aureus*-2.9% (1/34). ABST results of *Acinetobacter* spp. were 100% resistant to ceftazidime (20/20), ciprofloxacin (20/20), levofloxacin (20/20), imipenem (7/7), and 95% resistant to amikacin (19/20), gentamicin (19/20), piperacillin-tazobactam (19/20), sulfamethoxazole-trimethoprim (19/20), and ticarcillin-clavulanic acid (19/20). However, 100% of *Acinetobacter* spp. were sensitive to polymyxin B (20/20). Mortality rate of patients with ICUAIs was 29.4% (10/34) whereas it was 24.07% (52/216) amongst the non-infected patients. In conclusion, the most frequent ICUAI was RTIs which were mainly caused by *Acinetobacter* spp. that was resistant to most of the routine antibiotics. The important risk factors for ICUAIs in the present study were intubation, nebulization, ventilation, and CPAP. Although the mortality rate of ICUAIs was slightly higher, there was no significant increase in the mortality rate due to ICUAIs.

Keywords: ICU-acquired infections, Nosocomial infections, Mortality, Risk factors, *Acinetobacter* spp

¹ Department of Medical Microbiology, Faculty of Medicine, University of Kelaniya, Sri Lanka

² Microbiology Laboratory, Base Hospital, Wathupitiwala, Sri Lanka

Precipitating factors of acute severe asthma among children of 3-15 years: A descriptive cross-sectional study

Wijesooriya L. I.^{1*}, Perera P.², Sunil-Chandra N. P.¹

Despite a better understanding of pathophysiology and novel treatment modalities, children presenting with acute exacerbation of asthma (AEA) are still common. Descriptive information on asthma and factors precipitating AEA would provide a better understanding of the reasons for AEA. The present study aimed to identify such factors in a cohort of children in Sri Lanka. A descriptive cross-sectional study was conducted at the Teaching Hospital, Ragama, Sri Lanka involving children between 3-15 years. The sample consisted of 100 children admitted with AEA. Events that led to AEA were obtained from the mother. Data were obtained using a questionnaire from parents/guardians/children and analyzed using R-statistical software. Around 80% of the recruited children were in the 5-10-year range, and there was no significant gender difference. Of the descriptive data, potential risk factors identified for AEA were indoor smoking 12%, use of mosquito coils 28%, use of joss sticks 43%, and specific foods such as goat milk, yogurt, curd, ice cream, etc.-30% and use of firewood for cooking 39%. Regarding the risk factors for AEA, the intake of specific foods was significantly higher in association compared to indoor smoking ($P=0.011$). Sixty-six children had a full blood count which showed leukocytosis in 33.4%, neutrophilia in 62.1%, lymphocytosis in 6.1%, and eosinophilia in 9.1%. Neutrophilia was significantly higher compared to lymphocytosis ($P=0.000$) and eosinophilia ($P=0.000$) in the study cohort. CRP was available in six patients, of which three had increased levels. Blood cultures were available in 11 patients, but all were negative. None of the children had a microbiological diagnosis. Of the 21 children who underwent chest x-rays, only one had evidence of pneumonia. Fifty-two percent of children presenting with AEA were on regular inhaled therapy. Identified main risk factors for EOA were indoor smoking and burning of Joss sticks or firewood. In nearly one-third of the patients, food items were the precipitating factor. Though respiratory tract infections are implicated as a major cause of AEA, only a smaller percentage had evidence of infections. This may be because routine microbiological investigations were not employed. More than half of the children presenting with AEA were on regular inhaled therapy raising the question of the appropriateness of the medication used and the compliance with treatment.

Keywords: Exacerbation of asthma, Risk factors

¹ Department of Medical Microbiology, Faculty of Medicine, University of Kelaniya, Sri Lanka

² Department of Pediatrics, Faculty of Medicine, University of Wayamba, Sri Lanka

*lakmini.w@kln.ac.lk

The physical and functional outcomes after ultrasound guided intramuscular botulinum toxin injections in ambulatory children with cerebral palsy attending to a multidisciplinary tertiary care center

Fernando W. P. N.^{1*}, Safinaz Z. M. F. Z.¹, Wijayasinghe W. A. P. N.¹, Siriwardana S. A. S. R.², Vipulaguna D. V.³, Sumanasena S. P.¹

Hypertonia is one of the major manifestations and affects the movement and posture of children with cerebral palsy (CP). Evidence-based interventions for hypertonia include the administration of botulinum toxin (BoNT-A) with adjunctive therapy. Administration of BoNT-A, an adjunctive to physiotherapy interventions has demonstrated a significant improvement in gait pattern, range of motion of muscles as well as functional abilities. This study aimed to investigate the physical and functional outcomes of ultrasound-guided BoNT-A injections for lower limb hypertonia in ambulatory children with CP, Gross Motor and Functional Classification System (GMFCS) level I, II, and III. This retrospective study was conducted using the medical records at Ayati center, of the children with CP who received lower limb BoNT-A injections. Besides, these children have received evidence-based interdisciplinary interventions such as physiotherapy, and occupational therapy and have been referred to devices such as Ankle Foot Orthoses along with serial casting, and tone-managing medications. The Modified Tardieu Scale (MTS) and the Edinburg Visual Gait analysis (EVG) were done to assess the physical outcome and the Gross Motor Function Measure (GMFM-66) and the GMFCS level were assessed for the functional outcome before and after BoNT-A treatment. Seven children (4 males and 3 females) with CP were included. The age range was 23 to 118 months (mean 62 ± 31.37 months). Most of the children had bilateral involvement (85.7%) and had diplegic topographical distribution (42.9%). Twenty-eight percent had quadriplegic CP. Distal injections for foot deformity were given on 3 occasions (42.9%), while multilevel injections targeting the muscles of the three joints, hip, ankle, and/or knee were given on 4 occasions (57.1%). Participants with good functioning according to their GMFCS level were more likely to receive a distal, rather than proximal injection. The most common injected site was the plantar flexor muscles for dynamic foot deformity (28.6%). The second most commonly injected site was the hip adductor muscles and the knee flexor muscles. The Modified Tardieu Scale of hip adductors, hamstrings, and plantar flexors has improved after BoNT-A treatment, but these changes were not statistically significant. The mean EVG scores on the right leg were $12.86 (\pm 5.367)$ before treatment and 10.43 ± 4.894 after treatment. The mean \pm SD of EVG scores on the left leg was 14.57 ± 6.37 before treatment, and 12.0 ± 4.08 after treatment. There was a statistically significant mean reduction in the EVG score on both sides ($p < 0.05$). There was a significant improvement in mean GMFM-66 scores from $54.72 (\pm 10.44)$ before the BoNT-A treatment, to $61.61 (\pm 13.27)$ after treatment ($p < 0.01$). GMFCS level following treatment improved in 28.6% of the participants and has not changed in five participants. There is a significant improvement in the functional outcomes of children with ambulatory CP who received BoNT-A adjunctive to physiotherapy interventions.

Keywords: Cerebral palsy, Hypertonia, Botulinum toxin, Functional outcomes, EVG, GMFM

¹ Ayati National Center for children with Disabilities, Ragama

² Department of Anatomy, Faculty of Medicine, University of Kelaniya, Sri Lanka

³ Regional Director of Health Services Department, Gampaha

*piumalfernando@gmail.com

Role of *Mycoplasma pneumoniae* in the exacerbation of childhood asthma in Sri Lanka

Wijesooriya L. I.^{1*}, Chalker V. J.², Perera P.³, Sunil-Chandra N. P.¹

Asthma is a major public health concern, particularly in children. Exacerbation of asthma (EOA) is life-threatening and respiratory infections (RIs) play a key role. Pediatric RIs are empirically treated with macrolides aiming *M. pneumoniae*. Although EOA and *M. pneumoniae* have been reported in many countries, no published data on them is in Sri Lanka. The present study aimed to identify the role of *M. pneumoniae* in EOA in children in Sri Lanka. A case-control study was conducted in the pediatric unit of North Colombo Teaching Hospital, Sri Lanka involving children between 3-15 years. Cases-children with EOA. Controls-children with stable asthma without exacerbation. Each group consisted of 100 children. Sputum/throat swabs were tested for *M. pneumoniae* using GeneProof *M. pneumoniae* RT-PCR kit, which targets community-acquired respiratory distress syndrome (CARDS) toxin. Age distribution-80% of cases and 87% of controls were 5-10 years. Males and females were equally distributed in cases while it was 47% and 53% respectively in the control group. Of the samples, 78% were sputum and 22% were throat swabs in cases and 100% were throat swabs in controls. Macrolides were used to treat 42% of cases. As per *M. pneumoniae* RT-PCR data, 1/100 were positive from cases and none was positive from the control group. *M. pneumoniae* was uncommon in cases (1%) and absent from the control group. Macrolides are used widely in children for RIs aiming *M. pneumoniae*. Yet, it does not seem a major contributing factor to asthma exacerbation in the study cohort. However, a large proportion of cases receiving macrolides may have reduced the detection of *M. pneumoniae*. Empiric use of antibiotics in children with asthma may be better targeted with microbiological screening to inform treatment. Inappropriate use may result in the development of resistance to other common respiratory pathogens.

Keywords: Exacerbation of asthma, *Mycoplasma pneumoniae*, Antibiotic use

¹ Department of Medical Microbiology, Faculty of Medicine, University of Kelaniya, Sri Lanka

² Respiratory and Vaccine Preventable Bacteria Reference Unit, Public Health England, United Kingdom

³ Department of Pediatrics, Faculty of Medicine, University of Wayamba, Sri Lanka

*lakmini.w@kln.ac.lk

Comparison of Sebia capillary electrophoresis with the Bio-Rad VARIANT II HPLC in the evaluation of HbA2 in diagnosing beta thalassemia

Thilakarathne S.^{1,2}, Wickramasinghe M. G. C. N.³, Perera H. L.⁴, Premawardhena A. P.⁴

The guideline for diagnosis of beta thalassemia trait in Sri Lanka defines low red cell indices (MCV<80 fl, MCH<27 pg) in FBC and HbA2>3.5% by quantification. Different cutoffs for HbA2 value are used in other countries (i.e. in India >4%). Thus, the precision of the HbA2 value is crucial for labelling a person as beta thalassemia trait. High-Performance Liquid Chromatography (HPLC) and capillary electrophoresis (CE) are two different techniques for quantifying HbA2 levels. This study aims to compare the HbA2 results of these two systems in individuals with varying HbA2 values and to assess the consistency when repeated of the two systems. The Bio-Rad VARIANT II HPLC (Bio-Rad, Hercules, USA) and the Sebia Capillarys CE (software version 9.3) analyzers were used as directed by the manufacturer. Using normal and pathological quality control materials, we determined the quality parameter, "between day precision", of both analyzers as per CLSI guidelines (EP15-A2 document). EDTA anticoagulated blood samples of patients (203) were analyzed by both methods during a 3-months period. Subjects (100) with HbA2 values between 1.8-3.3% were considered non-beta thalassemic, i.e. normal, while individuals (50) with HbA2 values >4.1% were categorized as beta thalassemia trait. We defined HbA2 levels as borderline (53) if they were between 3.4 and 4.0%. Incompatible FBC patterns and iron deficiency anemia was excluded from each group. Data analysis was performed using SPSS statistical software. HbA2 values by the CE method were slightly but significantly lower than those of the HPLC method, with a mean difference of 0.24 (Paired t-test; p < 0.001). Also, HbA2 results by HPLC and CE methods showed a good relationship between each other (Pearson coefficient correlation; r was 0.98). We statistically analyzed this variation and relationship separately among normal, beta thalassemia trait and borderline groups. The variation in HbA2 value was high (mean difference; 0.27) among the normal group, while it was less (mean difference; 0.15) among beta thalassemia traits. The beta thalassemia trait group showed the highest positive relationship (r=0.92). The borderline group showed the least positive relationship (r=0.76). However, both analytical systems showed very close results (CV< 10%) when repeating the same sample between different days. This confirmed the excellent repeatability and acceptability of generated results by both analyzers. In conclusion, HbA2 values obtained from the two methods have a consistent and significant difference in normal, beta thalassemia trait and borderline samples. The variation in HbA2 values between CE and HPLC methods will make the accurate diagnosis of beta thalassemia traits more difficult based on a single reference cutoff value in the borderline group. Therefore, when issuing a diagnosis of beta thalassemia trait in borderline values, this machine-related variation of the HbA2 level should be borne in mind.

Keywords: Beta thalassemia trait, HbA2, Borderline HbA2, HPLC, CE

¹ Department of Medical Laboratory Science, Faculty of Allied Health Sciences, University of Peradeniya, Peradeniya, Sri Lanka

² Faculty of Graduate Studies, University of Kelaniya, Dalugama, Sri Lanka

³ "Hemals" Adolescent and Adult Thalassemia Care Unit, North Colombo Teaching Hospital, Sri Lanka

⁴ Department of Medicine, Faculty of Medicine, University of Kelaniya, Sri Lanka

*shyamali5thilakarathne@gmail.com

**Humanities
and
Social
Sciences**

A study of the hidden secrets of Saliya - Ashokamala's love story

Wickrama S. M.

As lovers Saliya and Ashokamala are a unique pair of characters rooted in folklore, literature and history. Further, Saliya-Mala is the Sri Lankan symbol of immortal lovers of world literature like Rama-Sita, Radha-Krishna, Romeo-Juliet and Shah Jahan-Mumtaz, who are revered in the world history. This becomes the most interesting royal story because Saliya is the son of King Dutugemunu, the hero of this country's history, and his lover Mala (Ashoka Mala) belongs to the lowest caste called Rodi (Sadol/Chandala). These two are also prominent figures in local art. In addition, this story has a significant place in the folklore of this country in terms of religion, social background, ancient irrigation system, agriculture, beliefs, ancient social system, medical system, governance and monarchy. According to the introductory story of the *Mahavamsa*, the most significant historical source in the country, Saliya and Mala were rejected by the royal family. Therefore, Mala is rooted in the society as a low caste woman. There are many legends about them in Mihintale, Maradankadawala, Vijithapura, Kalawewa, Rajanganaya, Kala-Oya, Puttalam, Nochchiyagama, Wilachchiya and Tantirimale areas, outside the Anuradhapura city. According to these stories, and other historical sources, there was another reason why Prince Saliya did not receive the kingship. It is a struggle regarding the acquisition of state power. The Indian Shakyas who have taken over the power in the history of this country starting from King Vijaya, prevented the possibility of local ethnic groups coming to power in this country. And they don't even allow another group of *Aryans* to gain power. The main secret hidden here is that Saliya's mother belongs to the local Yakkha tribe. On the other hand, Prince Saliya is not greedy for state power because he is a Bodhisattva figure. According to some factors, Mala is not a low-caste woman. In the historical book *Saddharmalankaraya*, which mentions this legend in more detail, the name of Ashokamala's mother is Kammaradhitha, which means that she belongs to the industrial caste. According to the ancient Indian caste system, industrialists belong to the Vishwa Brahmin caste. But the standard story says that Prince Saliya lost his kingship because of the image of a Chandala girl named Ashokamala. Due to the underestimation given to them by history, a valuable love story belonging to Sri Lankan literature has been distorted. This paper studies this aspect about their background. Data collection and analysis were done through interviews, observations and inter-analysis methods, within the North Central and North Western Provinces. This shows that Saliya-Mala are two characters who are revered and admired by the public. Although it is well known that Prince Saliya was fascinated by Mala because of her beauty, she was known for her intelligence and foresight beyond the series. This study attempts to bring to life two characters who were killed by history.

Keywords: Folklore, Kingship, Beauty, Lovers, Secrets

An analytical study of thematic roles functioning in Hindi syntax

Premathilaka H. I.^{1*}

Thematic roles attempt to capture similarities and differences in verb meaning that are reflected in argument expression, with emergent generalizations that will contribute to the mapping from semantics to syntax. They belong to the semantics or syntax interface. If there is a verb present, it is usually most directly responsible for the thematic role, while the argument specifies the identity of the participants of the sentence. The objective of the present study is to map the thematic roles of Hindi language to identify the thematic relationship in Hindi syntax. The present study focuses on the conceptualization of semantic roles and their status in theories of grammar and the lexicon in Hindi, as well as on diverse and probably complementary ways of deriving or identifying them based on linguistic data. Particularly attention is given to the question of what kind of thematic roles function in Hindi language. Data were gathered using library surveys and verified by Hindi language native speakers. Data analysis was performed as an analytical study based on syntactic and semantic theories. The present analysis was carried out using thematic roles currently identified by linguists. The key research findings of this paper are based on identifying several features of thematic roles belonging to Hindi language. This paper emphasized that different semantic roles can be assigned to arguments of different lexical semantics.

Keywords: Grammar, Hindi lexicon, Hindi syntax, Semantics, Thematic roles

¹Department of Hindi Studies, University of Kelaniya, Sri Lanka
*hasi.premathilaka@gmail.com

The musical culture of Ceylon Africans: A case study of *Maanja* tradition in the Sirambiadiya village, Sri Lanka

Kumara J. C. R.* , Narangoda P.

The present research examines the musical culture of Ceylon Africans (Kaffir) in the Sirambiadiya region, in Puttalam district, in North-Western Province. They are a group of community descending from the post-colonial period of the country. Evidently, the Kaffirs of Sirambiyadiya village inherit a particular style of music called *Maanja*, demonstrating some unique characteristics that have also become part of Sri Lankan culture, especially by spreading the tradition of *Baila Kaffirinha*, which continue to be very popular in the country. However, the Kaffirs of Sirambiadiya call their music *Maanja*. These songs have only a few verses: five or six lines or less. These same lines recur in different tempo in their singing. The singing primarily starts in slow tempo and increases gradually indicating that the dance is incorporated into the ongoing music. They accompany some percussion instruments such as Dolak (Dolki or Dollakkiya), and Rabana as the principle beat keeper, yet they use with it some home utensils i.e., spoons, glass bottles, common furniture like polished coconut shells, along with some coins. The word '*Maanja*' is derived from the Portuguese word 'Marchas,' kind of song sung in the Portuguese wedding ceremonies and festivities. Most of these *Maanja* songs are based on six-eight (6/8) beats. It is revealed that the Sri Lankan *Maanja* demonstrates some connotation to Portuguese Marchas in a very locally customized manner in which the Portuguese descendants of the country acculturated themselves while introducing the Portuguese cultural affinities *vice versa*. Thus, the themes of *Maanja* songs range from appreciating nature, childhood, livelihood of people, identified as child flying a kite, love, the sea, the birds, and devotional songs etc. Within such a background, the objective of the present research is to identify the evidence of musical ensemble of Kaffirs in Sirambiyadiya such as musical structures, playing techniques, singing styles, melodic patterns, performance settings, and the instruments to examine the independent characteristics of *Maanja* tradition within the particular socio-cultural background, by preserving the value of one of the diminishing cultures in Sri Lanka right now. It can be concluded that identifying the *Maanja* music tradition of Ceylon Africans in the Sirambiadiya region is significant for them to evolve as a minor music tradition, yet, unique to the country. The present study follows the qualitative research methodology including on site data collection with recorded music and interviews with the community, analysis, interpretation, and conclusion. Data is also collected from the field study, scholarly studies, library and archival surveys, and discussions.

Keywords: Portuguese, Sri lankan music, Ceylon africans, Maanja tradition, Sirambiadiya, Kaffir

Poems in resistance in the early colonial period in Korea, through Yi Won-Rok and Yun Dong-Ju poets

Deshan R. S.^{1*}

This article is a study about the poems in resistance in the early colonial period of Korea. The colonial period of Korea begins in the first half of the 20th century and that period was from 1910 to 1945. Colonialism is the concept of one country taking over the authority and the control of another country by force. Korea was ruled by Japan until 1945. After the Japanese occupation of the Korean peninsula, Koreans faced a very difficult period due to the extreme brutality of the rules imposed. In late 1940s, at the end of the Japanese occupation, both teaching and using of Korean language were officially banned, and the Koreans were forced to change their names into Japanese style. These brutal actions made Koreans more irritated, and Koreans engaged to unite to achieve their freedom. Therefore, the first revolt against Japan began in 1919 after the death of the last king of Joseon, Gojong (고종). During this period Yi Won Rok was a teacher and an activist in the Korean independence movement. He delivered his liberation message through his poems. Yun Dong-Ju was a student who went to study literature in Japan during the colonial period. However, the official language was Japanese for administration and education during that time. Subsequently, most of the themes of the poems were about achieving personal freedom and freeing their country from Japan. Therefore, Yi Won-Rok and Yun Dong-Ju are the best poets of this period who should be studied, and some other famous poets were named national heroes because their poems strongly expressed the liberation of their motherland from Japan. In this study, an analysis of the books and later research about the colonial period in the Korean peninsula will be conducted. Some of the poems are written in Chinese characters, and their English translations are used for the analysis. Moreover, a study of Korean poems and research through books have been conducted for study. *Mirrored Minds: A Thousand Years of Korean Verse* is an open-source book published by the Literature Translation Institute of Korea and it has been used to extract English Translations of their poems. YouTube and other video sources, past literature research papers have been used to extract more details about their poems and other aspects. This study shows that both poets have been creating their poems waiting for liberation. Their main aim is to achieve personal freedom and independence. Therefore, their writing shows resistance without any vicious feelings. The futility of waiting for freedom can be discerned in Yi Won Rok's early writings. Yi Won Rok and Yun Dong-Ju used words and phrases in a very idiosyncratic way. They tried to convey the value of freedom to their Korean people. Although their efforts were successful, however, they could not enjoy freedom because they have already left this world. Nonetheless their writings and poems are still alive among all Koreans.

Keywords: Colonial Korea, Korean poets, Colonialism, Resistance, Liberation

¹ University of Kelaniya, Sri Lanka
*rsdeshan@gmail.com

Translation strategies of humor in subtitling with special reference to the English movie *Johnny English Strikes Again*

Ratnayake I.^{1*}

Audiovisual translation, particularly subtitling, draws the attention of a number of scholars. However, the translation of humor in subtitles is a challenging task as humor includes a broad collection of cultural and linguistic expressions. The present study is an attempt to investigate the translation strategies of subtitling humor into Sinhalese, determine to what extent the translation strategies have been utilized, and to compare the different strategies utilized by the different subtitlers in order to convert the humor into Sinhalese. The study focused primarily on the Zabalbeascoa's categorization of humor to identify the subtitles which carry humor. The movie *Johnny English Strikes Again* form the corpus of the study. The study was carried out based on Gottlieb's categorization of subtitling strategies to determine the translation strategies employed by subtitlers. Two Sinhalese subtitles scripts provided by two different subtitlers have been used to find out the translation strategies. This research examines the strategies adopted by the subtitlers by comparing the segments of the Source Text and the equivalent of the Target Text. The results of the study show that the most common translation strategies adopted by translators in subtitling humor from English into Sinhalese are "transfer", followed by "paraphrase". Such use of subtitling strategies suggests that the translation is assisted by the simplicity of the Source Language and the non-verbal cues of the actions.

Keywords: Audiovisual translation, Culture, Subtitling humor, Subtitling strategies, Translation strategies

¹ Department of Linguistics, Faculty of Humanities, University of Kelaniya, Sri Lanka
*marat191@kln.ac.lk

The impact of watching English video programs in English language acquisition as a second language (A case study conducted in Rathnapura and Kurunegala districts)

Chandrasekara E. C. M.

Language is an important, basic and primary tool for communication. Language acquisition is an unconscious process that is necessary for the language development. In recent years, the usage of video, audio and other visual materials has increasingly been used for different kind of purposes such as education, entertainment and communication etc. These usages may have a direct or an indirect impact on the language acquisition process. This study has been conducted to identify the impact of watching English video programs in English as a second language acquisition process. For the study, by using direct sampling method, 50 students who are learning in grade five and four have been selected from two primary schools in Kurunegala district and Rathnapura district. For the selection, common pretest has been given and 25 students from each school have been selected depending on the pretest marks. A DVD that is containing video materials (cartoons, lessons and songs) has been distributed among all selected students. They had to watch the video programs for one and a half months. After that, the posttest has been given. Hypothesis testing has been conducted by using marks of the pretest and posttest. Paired sample t-test in MS-Excel has been used for the analysis. The result of the analysis does not support the assumption that “there is an impact of watching English language video program on English as a second language acquisition process”. Thus, depending on the results H₀ has been accepted and H₁ was rejected. However, when comparing the pre and posttest marks, there was a slight difference between the marks of students. Some students have scored higher marks than the pretest, but these differences are negligible. Thus, depending on the results of the analysis, it could be concluded as there is no considerable impact of watching English language video programs on English language acquisition process.

Key Words: Video programs, Second language acquisition, School students, Paired sample t-test

The pronunciation and reading difficulties faced by the Sinhalese students when learning Hindi as a foreign language

Mudage J.

Both Sinhala and Hindi languages originated from Sanskrit language. As a result, there are so many similarities between Hindi and Sinhala. Sinhalese students learn Hindi as a foreign language. When they learn Hindi, they face so many difficulties in writing, reading, speaking and understanding. In this research, the pronunciation and reading difficulties faced by the students when learning Hindi are discussed. Sometimes, one letter has two different pronunciations. So, the students find it difficult to select the correct pronunciation. When speaking Sinhala, there is no difference between the soft and hard consonants (alpaprana and mahaprana). So, the students speak Hindi without differentiating between the soft and hard consonants. But in Hindi, it must be emphasized, otherwise there may be difficulty in finding the meaning. This can be identified as a major pronunciation difficulty faced by the Sinhala speaking students when learning Hindi as a foreign language. In Hindi language, most of the words end with vowelless consonants. But in writing, this vowel lessness cannot be shown. So, the students get confused when reading Hindi, because in Sinhala if the vowelless consonants are used, they are shown with a special symbol. In Hindi, when 'ha' consonant is used, the letter before 'ha' changes. It is also a difficulty faced by Sinhala students who are learning Hindi. In Hindi, some special consonants are being used which are not found in Sinhala. So, the students find it difficult to pronounce these consonants. By identifying these major difficulties which are faced by the Sinhala students, it will be easy to teach and learn Hindi as a foreign language. Primary and secondary data had been collected to compile this research.

Keywords: Pronunciation, Foreign language, Reading, Consonants, Hindi language

A study on the application of the audio - description technique for the cinematic entertainment of visually impaired people with special reference to Sri Lankan audience

Leeniyagoda S. O.^{1*}

Audio - description is an audio track that narrates the relevant visual information presented on the screen. Gregory Frazier introduced audio - description technique for the “television for the blind,” in 1974. Though this technique is adopted in international cinema, its application cannot be seen in Sri Lankan cinema for the benefit of visually impaired people. The research was focused mainly on the level of cinematic entertainment of visually impaired children in Sri Lankan society. The main objective of this research work is to make film directors aware of the need to add audio-descriptive reading to films to make them suitable for visually impaired children to enjoy, and to create a suitable audience for visually impaired people in Sri Lankan society. The information about the way of enjoying a cinematic creation of a blind child was accessed by the means of suggestion and ideas, and through interviews done among selected children in the 13-15 age limit. As a conclusion, this research was conducted to fill the gap in the strategy that can be presented for the cinematic entertainment of visually impaired people in Sri Lanka. Moreover, the information extracted is positive regarding the appreciation of cinema.

Keywords: Audience, Audio description, Cinema, Entertainment, Visually impaired

¹ Department of Fine Arts, Faculty of Humanities, University of Kelaniya, Sri Lanka
*salee191@kln.ac.lk

Identifying the role of sitar in Sri Lankan “*Bodu Bethi Gee*” genre

Tennakone T. M. M. K.

The main objective of this study is to identify the specific use of the sitar in Sri Lankan Buddhist devotional songs known as *Bodu Bethi gee*. During the 1970s to 90s, most composers active in this genre used special sitar techniques in their musical pieces to create a distinctive flavor, deep affection, and devotion, which ultimately added a Sri Lankan kind-of-identity to these repertoires. Though several researchers have examined the role of the sitar in Sri Lankan *Sarala gee* (light songs), none so far has examined its role in *Bodu Bethi gee*. In methodological terms, the present study is based on fieldwork, analysis of audio-visual documentation, and formal and informal interviews and discussions with music composers, sitar players, and local instrument makers in Sri Lanka. It pays attention to specific interventions in the instrument construction (shape of the bridge), the playing techniques, the way of harmonizing the sitar with the other instruments, an analytical survey of selected music scores, and an in-depth examination of the structure of a selected example.

Keywords: *Bodu bethi gee*, Sitar, Sri Lankan music industry, Music compositions, Sitar techniques

Western theory in non-western, lesser-known literary translation: Perils of Venuti's foreignization in English translations of Sinhala novels

Dissanayake A. U.

This paper aims to examine the suitability of applying translation theories originating from western cultural contexts to translations of literature written in lesser-known non-western languages. It argues, given the vast differences that exist between different languages, theories that evolve from both western and dominant non-western cultures cannot be removed from their cultural contexts and applied to the translations of lesser-known languages. Similarly, in the context of postcolonial discourses, non-western theories from powerful former colonies that focus on resistance, decrying the violence committed on their literature by the European colonizers fail to address issues of lesser-known former colonies whose literary translations did not undergo similar forms of violence. The study examines a specific western theory, namely, Lawrence Venuti's foreignization strategy to determine if translators of literature written in a lesser-known non-western language use this strategy and how effective this strategy is for such translations. The data for the study was collected by analyzing the strategies used in translating culture specific items in three Sinhala novels into English; "Viragaya" by Martin Wickeremasinghe translated as "The Way of the Lotus" by Ashley Halpe, "Charita Tunak" by K. Jayatilake translated as "The Grain and the Chaff" by Ediriweera Sarachchandra and "Hevanalla" by Siri Gunasinghe, translated as "The Shadow" by Hemamali Gunasinghe. Data related to the strategy used by each translator shows the translator of "The Shadow" uses the foreignization strategy; The translator of "The Way of the Lotus" uses the domestication strategy. The translator of "The Grain and the Chaff" uses both strategies approximately equal number of times. Thus, only one translator, the translator of "The Shadow" uses Venuti's strategy in the translation process. However, due to the lesser-known status of the Sinhala culture, the translator is compelled to use excessive amounts of alien words and provide explanations via footnotes. As a result, the translation lacks aesthetic features and fails as a literary translation. Similarly, in using the domestication strategy, "Way of the Lotus" fails in its inability to achieve cultural communication. By using both strategies, "Grain and the Chaff" ensures the translated text preserves the cultural and the aesthetic features of the source text and achieves a comparatively more successful translation. It is this balanced strategy that is more suitable for translations of literature written in lesser-known non-western languages. Venuti's strategy does not account for this balance. These findings indicate theories that evolve from western cultures do not encompass translation processes suitable for literature written in lesser-known non-western languages and signify the need for theories that specifically address lesser-known non-western cultural contexts.

Keyword: Foreignization, Lesser-known languages, Non-western translation theory, Sinhala culture specific items, Venuti, Western translation theory

Effectiveness of using technology to enhance the English communication skills of students in the vocational stream of newly introduced 13 years of guaranteed education program: a case study of selected schools in the Kelaniya education zone

Dissanayake D. M. P. M.

In Sri Lanka, the lack of knowledge and skills in English language competencies is one of the key reasons for youth unemployment. Further, youth dropping out of schools creates a youth population that lacks skills and qualifications relevant to finding decent employment. As such, the Government of Sri Lanka introduced the 13 Years of Guaranteed Education Program to address an array of issues including the above related issue among school children. This program creates a space for students to learn vocational subjects along with Business and Communication English in a technology-based setting. As such, this study aimed to understand the effectiveness of using technology in teaching English language in the vocational classroom. Based on the review of literature, it was identified that Computer Assisted Language Learning (CALL) can be a key resource that could be utilized to teach English for Vocational Purposes (EVP) and Vocational English as a Second Language (VESL). There are many techniques such as learner centric models that could be adapted in an EVP classroom to improve the effectiveness of the teaching and learning experience. The methodology was based on questionnaires and proceeded with qualitative and quantitative questions. The analysis of the data collected suggested that the program has been effective in integrating technology in the language classroom. Both students and teachers show satisfactory levels of interest and very minimal resistance to using technology in the language classroom of the 13 Years of Guaranteed Education Program. However, few ways of improving the effectiveness of using technology such as better coordinated training programs, orientation programs and restructuring of syllabi were suggested as part of this study based on the data collected. Given the small size of the sample, it is recommended to conduct an in-depth comparative study on the program in different Divisional Secretariat Divisions to obtain a better understanding on the overall effectiveness of integrating the program.

Keywords: Computer assisted language learning, English as a second language, English for specific purposes, English for vocation purposes, Vocational English as a second language

A comparative study of the depiction of paraphilic disorders in *Underpants thief* and *la pianiste*

Wathsala H. M. S.¹, Ranthilini P. V. S. S.

Paraphilic disorders are atypical sexual urges that lead to stress and harm for both the individual with disorders and others. World cinema has treated paraphilic disorders as a major trope in films like *Salo* and *Secretary*. Though Sri Lankan cinema has largely chosen not to depict paraphilic disorders, recent films like *Underpants Thief* have attempted to explore the experience of paraphilia. The objective of this research is to analyze how paraphilic individuals are portrayed in the two films *Underpants Thief* by Somaratne Dissanayake (2021) and *La Pianiste* by Micheal Haneke (2001). The research adopts a qualitative methodology. Accordingly, a comparative critical analysis of the two films was conducted with regard to the cinematic construction of the paraphilic protagonists and the societal reaction to paraphilic disorders as depicted in the films. The study reveals that the protagonist- Sam in *Underpants Thief* suffers from fetishism and frotteurism while Erica in *La Pianiste* suffers from sadomasochism, according to the DSM-5 classification. It is also noted that the depiction of disorder in *Underpants Thief* is problematized through the incorporation of intellectual disability into the characterization of the protagonist. Sam is presented in the light of a person with disabilities and the margins between paraphilia and intellectual disability seem to be blurred by an overambitious attempt at increased representation and inclusion which ultimately leads to confusion. *La Pianiste*, however, avoids such pitfalls and focuses on deviant sexuality. The characterization of Erica portrays the female protagonist as a socially and economically active individual which is in direct contrast with the marginalized socio-economic existence of Sam, prompting the idea that the marginalization of Sam may be caused by his intellectual disability. In terms of the reaction to paraphilic disorders depicted in the films, it can be seen that *Underpants Thief* preaches an 'ideal' societal reaction to paraphilic individuals whereas *La Pianiste* depicts a reaction that is commonly displayed by society towards them. The didactic 'ideal reaction' promulgated by the former is presented through the character of Nayani, Sam's sister-in-law while the societal reaction to paraphilia is embodied by Walter, Erica's partner in the latter. The didactic purpose brought out is further contributed by the characterization of Sam through which the director presents a white-washed and seemingly innocent paraphilic individual. Such a didactic notion is not depicted in *La Pianiste*. In contrast, Erica is presented as a multi-faceted character and the background provided in relation to her paraphilia facilitates a nuanced, in-depth reading of her character. Thus, based on the qualitative analysis conducted focusing on the plot, characterization, music, symbols, and settings, this research concludes that the construction of the paraphilic protagonists and the reaction to paraphilic disorders in the two films are vastly different.

Keywords: La pianiste, Underpants thief, Paraphilic disorders, Comparative study, Micheal Haneke, Somaratne Dissanayake

¹ University of Kelaniya, Sri Lanka
*hmsanduathsala@gmail.com

The impact of integrating culture in developing listening and speaking skills in learning of French as a foreign language

Thebuwana K. L.

With the interdependence of globalism in the world, learning a foreign language has become a requirement rather than an indulgence. Yet, learning a third language may present a challenge and the issue within the selected group of students is no exception. Filling the gaps of noted scarcity in studies conducted among language learners in schools away from the capital, the following study has addressed the need to explore if the selected students of advanced level integrate the culture in developing listening and speaking skills in learning French as a foreign language. This study was conducted by inquiring the challenges faced by 20 students of Viharamaha Devi Balika Vidyalaya, Kiribathgoda. When learning French as a foreign language, it is considered as their third language in the order of learning languages. After being screened for mistakes, they tended to make when learning French as a foreign language, selected students expressed their opinions through a questionnaire and a worksheet which were then analyzed. Two French language teachers of the selected school were also given a questionnaire to inquire about their opinion on challenges faced by their students when learning French. In addition to the influence of culture on the development of French language learners' listening and speaking skills, the study also provided a basis for future research on whether other factors influence the learners in making progress in the French language other than the influence of culture in the development of listening and speaking skills of language learners. Findings suggested that the students sometimes lack knowledge in vocabulary which has led them to make mistakes in translating or constructing sentences in the French language. However, a deficiency of vocabulary due to the dereliction of the language may be the reason for that, and if there is such an influence, it has not been revealed in this study.

Keywords: Foreign language learning, Integrate, Culture, Listening and speaking skills

Influence of Buddhism on the novel *Wismrit yatri* by Rahul Sankrityayan

Senevirathna W. N. S.^{1*}

Mahapandit Rahul Sankrityayan is considered an eminent scholar of Hindi literature and a pioneer of travel literature. Sankrityayan was a recluse monk, traveler, follower of Buddhism, philosopher, archaeologist, sociologist, historian, politician and an exclusive worshiper of Hindi language. The entire life of Sankrityayan passed through four philosophical stages like Vaishnavism, Arya Samaj, Buddhist Philosophy and Marxism. The religion that influenced Sankrityayan's life the most was Buddhism. In 1972, when Sankrityayan reached Sri Lanka as a Sanskrit teacher, his attraction towards Buddhism increased even more. He started teaching as a teacher of Sanskrit language at Kelaniya Vidyalankara Pirivena and because of his love for Buddhism, he engaged in detailed study of Pali, Prakrit and Apabhraṁsh. In view of his expertise and in-depth study of Buddhism, he was awarded the title of 'Tripitakacharya'. In 1930, during his second visit to Sri Lanka, Sankrityayan took the transition to Buddhism. After this, he spread Buddhism actively. The humanism of Buddhism was practiced by Sankrityayan in his life. He wrote a large number of creative works such as novels, stories, travelogues, memoirs, autobiographies, essays, biographies and plays, etc., in which his experience, thinking and ideological vision are included. In fact, his research on Buddhism is considered epoch-making in Hindi literature. He deserves an unparalleled place in Hindi literature in terms of his immense personality and prolific creativity. The novels composed by Sankrityayan include *Jine ke lie*, *Singh Senapati*, *Jay Yaudhey*, *Madhur swapna*, *Wismrit yatri*, *Divodas*, *Rajasthani Raniwas*, *Biswi sadi*, and *Bhago nahi duniya ko badalo*. They are his unique creations. Out of these novels, *Wismrit yatri* which was written in 1954, is particularly noteworthy among the works that were influenced by Buddhism. This novel is related to the travels and activities of Buddhist-promotional activities of a 6th century Buddhist traveler Narendrayash. The purpose of this research article is to evaluate the impact of Buddhism on the novel *Wismrit yatri* by Rahul Sankrityayan. Many books have been written by scholars on the outstanding personality and work of Rahul Sankrityayan and some research work has been done on Rahul Sankrityayan by the scholars of different universities of India in the field of Hindi research. But there is still a lack of research and critical work on this topic. Therefore, that gap is filled by this research article. Analytical research methods have been used in the present research paper to fulfill the objective of the study. Authentic texts related to the research topic were pursued and critical articles and information material obtained from reliable classical journals and international publications were also reviewed. The significance of this research article is to discuss and inaugurate the human values that Rahul Sankrityayan has established through this novel related to humanity, equality, social justice etc.

Keywords: Travel literature, Tripitakacharya, Buddhism, Buddhist philosophy, *Wismrit yatri*

¹ University of Kelaniya, Sri Lanka
*vinodanijayawardana1210@gmail.com

Challenges encountered by English as a Second Language learners when acquiring English grammar implicitly via Zoom application

Jayathilaka K. G. R. H.

Grammar acquisition is an essential element of Second Language Acquisition. This study investigates the challenges encountered by English as a Second Language (ESL) learners when acquiring English grammar through games via Zoom application. What are the challenges encountered by ESL learners when acquiring English grammar through games via Zoom application? was the research question administered in the present study. The research was carried out among 158 full-time new entrants of the University of Colombo Institute for Agrotechnology and Rural Sciences (UCIARS). English grammar was taught implicitly using ESL grammar games in an online classroom in the current study. Data were collected through semi-structured interviews and observations. The findings revealed that although the lack of sufficient language to communicate was a challenge to some participants at the beginning of the intervention sessions, those participants subsequently managed that issue with the exposure to the target language. Moreover, it took some time for participants to get familiar with the Zoom application since online teaching was new to the Sri Lankan university context when the research was carried out. Moreover, some technical issues have also been challenging to the participants. The findings further indicated that although online learning is slightly challenging, ESL grammar games make a significant change on the achievement and the perceptions of the participants. Therefore, the present study recommends that, despite the challenges, games can be implemented productively even in a Zoom classroom to teach ESL grammar as it facilitates Second Language Acquisition (SLA). Furthermore, the findings would aid in providing an awareness to pedagogy of teaching ESL grammar.

Keywords: Challenges, ESL learners, Grammar acquisition, Grammar games, Second language Acquisition (SLA), Zoom application

The challenges faced by students in the interpretation classroom

Jayasinghe D. G. T. A.

The present research is an observational study on the challenges faced by 23 final year undergraduates of the Translation Studies Hons. Degree Program in the Department of Linguistics, University of Kelaniya, studying the course unit 'Introduction to Interpretation'. The undergraduates were taught by a professional interpreter. However, by observing the performance in the end semester examination, it was evident that the students face challenges in the learning process. Accordingly, the research problem of the present study was; 'What are the challenges faced by students studying Interpretation course unit?' The performance in the classroom and at the examination was initially observed and a follow up interview was also conducted in the process of identifying the challenges mainly based on Gile's theory of interpretation, followed by a qualitative analysis of the collected data to recognize where to make interventions in future. The main challenge identified in the research was that weaknesses in relation to bilingual competency such as errors in subject verb agreement, starting the interpretation from the wrong segment of the original utterance and issues in converting reported speech into interpretation mode, wrong use of terminology and forgetting known terminology due to excitement. Other challenges were excitement and fear when they were asked to start interpretation, forgetting the facts in the original speech, insufficient knowledge about current incidents, interpreting years and numerical statistics and translating sentence segments and the limited time for this type of a new course unit, which needs more active participation and constant practice. So, it was identified that interventions can be made with regard to duration allocated to the course unit and language aspects related to interpretation.

Keywords: Challenges in interpretation, Interpretation classroom, Introduction to interpretation, Translation studies, Undergraduates of University of Kelaniya

A study on the use of visual stereotypes in logo designs by Sri Lankan freelance logo designers

Amarakoon A.^{1*}

Most of the freelance and microwork community in the creative industry of Sri Lanka consists of logo designers, who utilize social media platforms such as Facebook for their promotional activities. These logo designers often showcase a collection of logo designs in the form of an online portfolio to convince potential clients to acquire their services. These portfolios often consist of personal projects done by the designers to exhibit their technical skills and creativity. However, it is evident that many of these portfolios consist of a considerable number of logo designs that are either highly influenced by or completely imitated from existing logo designs which can be found in a web image search. Apparently, these logo designs contain visual stereotypes or clichés associated with logo design. The present study attempts to examine, identify, and categorize the visual stereotypes used in the above-mentioned context, focusing on conducting an empirical inquiry that relies on personal experience as a graphic designer as well as an educator. A sample of sixty Facebook pages with a collection of logo designs, representing logo designers in Sri Lanka was used in this study. The Facebook pages were selected based on their audience using the number of followers as the main factor. The logo designs were examined considering their context, visual representation, and how the logo is presented as a final product. The identified stereotypes were categorized into three main groups namely, visual elements, stylistic representations, and visual presentations. Moreover, the identified visual elements were categorized according to their relevant industry and context. It was evident that a higher number of designers haven't paid attention to the originality, intended meaning, and pragmatic concerns of the design, in terms of visual and stylistic representation as well as the final output of the design. Even though many designers showcased a high level of technical skill in executing the design using digital applications, the results imply the application of a low level of skills in the conceptualization of original visual and aesthetic quality.

Keywords: Graphic design, Creative industry, Logo designers, Freelancing, Sri Lanka

¹ University of Kelaniya, Sri Lanka
* asitha.amarakoon@gmail.com

Examining the impact of video feedback as a teacher feedback method in English as a Second Language learners' paragraph writing

Thennakoon B. N. ^{1*}

Feedback provision is one of the productive ways of realizing learner performance in English as a Second Language (ESL) context. However, there is a continuing dispute over the efficacy of feedback. Even though teacher written feedback is the most frequently used teacher feedback form, studies have determined that it is disparaging for certain causes. As the link between English teaching and learning processes and technology reinforces, numerous techniques have been evolved in the area of language teaching one of which is giving video feedback to ESL learners' writings. Even though studies have been carried out to explore the potency of diverse feedback methods for writing, considering the dearth of research in exploring the pedagogical and practical appropriateness of video feedback for ESL writings in Sri Lanka, the present study intends to examine the impact of video feedback as a teacher feedback method in ESL learners' paragraph writing. Hence, the study adopted a true experimental research design. The empirical data for the study was gathered through the comparison of 20 first year undergraduates' multiple drafts of writing paragraphs and a questionnaire administered at the end of the study to the experimental group of the Department of Industrial Management at University of Kelaniya on a random sampling method. Over a five-week period, control and experimental groups were provided with written feedback and video feedback respectively. The gathered quantitative and qualitative data were analyzed using SPSS statistics and thematic analysis accordingly. The findings revealed that video feedback facilitated learners to incorporate higher level of corrections into their subsequent drafts than its written counterpart. In accordance with the descriptive analyses, majority of the participants believe that video feedback helps to improve writing skills, to pay more attention to instructor's comments, to get a better understanding of how to revise the writing, to spend more time reviewing the individualized screencast feedback and to understand issues related to the content and language of the writing. In addition, majority of the participants stated that video feedback is constructive, feels more conversational and interactive and is an accessible, user-friendly method and it allows to build a sense of closeness with the instructor. Despite the positive viewpoints, technical difficulties, initial anxiety and being a costly process were identified as the potential drawbacks of the approach. Subsequently, the findings of this study revealed that an advanced and a novel form of technology integrated feedback is essential in every ESL learning environment as most learners are pragmatic with the practice of the video feedback as an eligible practice in ESL writing. The findings retrieved from this study convey that video feedback due to its positive features to eliminate the drawbacks of teacher written feedback and ability to create a technology-based atmosphere, can be used as an alternative for teacher written feedback and is a pertinent practice in ESL writing. Hence, further research is needed to perceive the viability of video feedback for large learner cohorts.

Keywords: Feedback, Teacher feedback, Video feedback, Writing skills, Written feedback

¹ University of Kelaniya, Sri Lanka
*tmbnt201@kln.ac.lk

Target language or the first language? Employing first language in teaching grammar for undergraduates in a second language classroom

Amarasinghe H.^{1*}, Jayarathna D., Gamage C.

The impact of first language instruction in second language teaching and learning is a debatable area of research in which different scholars hold different views on the pedagogical usage of first language instruction in English as a Second Language (ESL) classrooms. In most ESL classrooms in Sri Lanka, teachers tend to follow an only English policy, where they deliver the lesson in English, especially grammar while aggravating the difficulty in comprehension. Additionally, students encounter a dilemma in using L1 in ESL classrooms in the higher education sector due to the absence of a solid conception of the medium of communication. Hence, this research is focused on the impact of first language instruction in Sri Lankan ESL classrooms. It is expected to examine the effectiveness of using L1 instruction in the ESL classroom to teach grammar and the perception of students regarding their preferred language of instruction. A mixed method was adopted to achieve the research objectives of the study. A purposive sample consisting of 60 first-year intermediate-level learners at the Faculty of Management and Finance of the University of Ruhuna was selected. These learners studied in the English Language Intensive Course (ELIC) conducted in their first academic year to cover all four language skills. Moreover, the students in the sample ranged from ages 21 to 23 and their First Language (L1) was Sinhala. Among them, 30 students were randomly assigned to the experimental group while the other 30 participants were allotted to the controlled group. To examine the impact of L1 in teaching grammar in an ESL classroom, the lessons on perfect tenses were prepared by the researchers. A pre-test was conducted with both groups at the beginning of the research to measure their existing knowledge of perfect tenses. Subsequently, the experimental group was given grammar instruction using both English and Sinhala languages whereas the controlled group was taught using only English. The grammar lessons were conducted for two weeks within 16 hours allocating 8 hours per group. Later, the same grammar test given at the beginning was administered to both groups as the post-test to measure the impact of using L1 instruction in the ESL classroom. Additionally, a Google form questionnaire including 5 open-ended questions was distributed to collect the perception on employing L1 in ESL classrooms. Subsequently, the data analysis methods include Statistical Package for the Social Sciences (SPSS) and thematic analysis. Findings reveal that the students of the experimental group who were exposed to both English and Sinhala instruction have made a significant improvement in their post-test results rather than the students in the controlled group. Moreover, the perspectives of students affirmed that the use of the first language by the teachers in the ESL classroom creates a non-threatening learning environment where they are able to grasp the language easily while the adherence to only English policy by teachers generates more complexities in comprehension. Therefore, this research suggests that using L1 instruction in ESL classrooms can be effective in fostering a second language.

Keywords: ESL, First language instruction, Grammar, Second language learning, Students' perspective

¹ University of Ruhuna, Sri Lanka
*hiranyaa1995@gmail.com

Language dilemma of post-independence Ceylon: a socio-linguistic perspective

Wickramarachchi M.

The post-independence Ceylon was born almost seven decades ago inhering some of the most enduring conflicts, paradoxes and dilemmas of governance at the time. The local élite of the new post-colonial administration took over a top-down, centralized and long-established policy and governance structure from the British, but immediately faced the twin challenges of addressing the growing demands of the Ceylonese citizens and establishing their own legitimacy among them. By the mid-1950s revitalizing Sinhala basa or the Sinhala language had become inter alia a symbolic priority of a vocal group of agitators from the majority ethnic group, Sinhalese, who were in a quest to re-establish local identity, tradition and authenticity. This bottom-up demand also received the tacit support of local political élite, who saw the cultural capital of these demands as a way of politically legitimizing themselves in the eyes of the Sinhalese. The language policy adopted by the second government of the independent Ceylon in 1956 was a result of this localization-inclined political thinking which also brought about abiding and long-drawn-out consequences. Primarily based on the literature survey of historical documents, this paper analyses the key language-related developments during the first two decades of the independence of Ceylon by applying the ideologies of Einar Haugen (language planning) and Pierre Bourdieu (cultural capital, language & symbolic power). This paper limits itself to inferring and discussing the linguistic projects launched immediately before the Independence as a bottom-up language revitalization effort and how it turned out to be a larger political project, afterwards. While contextualizing the social and political developments of the era, this paper underlines that the formation of post-independence Ceylon's language policy was born out of confrontations and dilemmas of the political elite and the local populace, intermingled with contemporary language and political thinking.

Key Words: Language policy, Language planning, Cultural capital, Indigenization, Language politics

English as a Second Language learners' perception on portfolio: An effective learning activity

Rizwan M. S. M.

This study aimed to examine the effectiveness of the portfolio as a learning activity to improve the professional writing skills of the first-year students of HNDE program conducted at SLIATE. This study was carried out on 150 students and categorized into experimental and control groups of 75 students each. The samples were the students of the Department of English at ATI Sammanthurai. To identify competence in writing, a diagnostic test was conducted on both groups. The portfolio technique was deployed for the experimental group whereas the conventional method was for the control group. Samples were instructed to submit all the learning activities assigned in professional writing contexts as a portfolio at the end of the semester. To distinguish whether there was a statistically notable difference between the groups, the independent samples t-test was administered. In order to compare the differences within the group, a paired samples t-test was directed. As per the performance in the post-test, there was a statistically notable difference among the samples due to the deployment of the portfolio which induces the students to writing skills. After the intervention program was over, a questionnaire was administered to the samples to obtain their perception of the portfolio in the context of professional writing. Using descriptive statistics, data obtained from the questionnaire were analyzed. The results demonstrated that ESL learners have active involvement in the portfolio for the assigned learning activities in the context of professional writing.

Keywords: ESL, Learning activity, Portfolio, Professional writing, Writing skills

මඤ්ජුශ්‍රීභාෂිත වාස්තු විද්‍යාශාස්ත්‍රයෙහි නිර්දේශිත හස්ත මිනුම් ඒකකය

පනාවල ධම්මධස් හිමි¹

ශ්‍රී ලංකාවේ ආරාම නිර්මාණය පිළිබඳ රචිත ප්‍රධාන සහ පැරණි ම සිද්ධාන්ත සංග්‍රහය වන්නේ ක්‍රි.ව. 5 -7 සියවස කාලයන්හි රචිත මඤ්ජු-ශ්‍රී භාෂිතවාස්තුවිද්‍යාශාස්ත්‍රයයි. එම කෘතියෙහි ආරාම නිර්මාණයේ දී නිර්දේශිත මිනුම් ගණනය කොට ඇත්තේ හස්තය නම් මිනුම් ඒකකය බහුල ව උපයුක්ත කරගෙන ය. සංස්කෘත වාස්තූශාස්ත්‍ර මූලාශ්‍ර අධ්‍යයනයේ දී කිෂ්කු, ප්‍රාජාපත්‍ය, ධනුර්මුෂ්ටි, ධනුර්ග්‍රහ ආදී විවිධ හස්ත ප්‍රභේදයන් හමු වේ. මඤ්ජු-ශ්‍රී භාෂිතවාස්තුවිද්‍යාශාස්ත්‍රයෙහි භාවිත හස්තය නිශ්චිත ව කුමන හස්තය ද යන්න ග්‍රන්ථයෙහි සඳහන් නොවේ. එහෙත් දී ඇති මිනුම් සියුම් ව පරීක්ෂා කොට අධ්‍යයනයෙන් යම් සාක්ෂ්‍යයක්, භාවිත නිශ්චිත හස්තය හඳුනා ගැනීමට උපකාරී වේ යැයි උපකල්පනයෙන් මෙම පර්යේෂණය සිදු කරන ලදී. ඒ අතරින් ප්‍රතිමාගෘහයේ අධිෂ්ඨානයේ උස සම්බන්ධ මිනුම් ඉතා වැදගත් වන්නේ එහි සඳහන් මිනුම් විස්තර අධ්‍යයනයෙන් ම.ව.ශා කෘතිය නිර්දේශිත හස්තයට අගල් කීයක් භාවිත වී ද යන්න නිශ්චිත ව හඳුනා ගැනීමට හැකි ස්ථානයක් වන නිසාය. තුන් මහල් ප්‍රතිමාගෘහයේ අධිෂ්ඨානයේ උස අගල් හතළිස් දෙකකි. එසේ ම මහල් එකොළොහක් වූ ප්‍රතිමාගෘහයෙහි අධිෂ්ඨානයේ උස හස්ත තුනක් හා අගල් දහ අටකි. තුන් මහල් ප්‍රතිමාගෘහයෙහි අධිෂ්ඨානයේ උසට අගල් සයක් එකතු කිරීමෙන් සිව් මහල් ප්‍රතිමාගෘහයේ අධිෂ්ඨානයේ උස ගණනය කළ යුතුය. කෘතියෙහි එකොළොස් මහල් ප්‍රතිමාගෘහයෙහි අධිෂ්ඨානයේ උස සෘජුව ම හස්ත 3ක් හා අගල් 18 ක් බව දක්වා ඇත. එසේ ම කෘතියෙහි දැක්වෙන පරිදි ප්‍රසාදයේ අධිෂ්ඨානයන් හෝජනාලයේ අධිෂ්ඨානයන් සමාන උසකින් යුක්ත වේ. එය අගල් හය බැගින් ක්‍රමයෙන් වැඩි කිරීමෙන් අධිෂ්ඨාන මිනුම් පහක් ලැබේ. අගල් හය අධිම උසයි. අගල් දොළොස හිතක නම් වේ. අටළොස් අගල මධ්‍යම උසයි. සුවිසි අගල උත්තමයි. හස්තයක් හා අගල් හය ශ්‍රේෂ්ඨ මානය බව ද දැක්වේ. මෙ ම ස්ථාන දෙකෙන් මඤ්ජු-ශ්‍රී භාෂිතවාස්තුවිද්‍යාශාස්ත්‍රයෙහි නිර්දේශිත හස්තය නිශ්චිත ව හඳුනාගත හැකි බව පර්යේෂණයෙන් සනාථ විය.

මුඛ්‍ය පද : ආරාම, කිෂ්කු, ප්‍රතිමාගෘහ, මිනුම්, හස්ත

¹ සංස්කෘත හා පෙරදිග ශාස්ත්‍ර අධ්‍යයනාංශය, මානවශාස්ත්‍ර පීඨය, කැලණිය විශ්වවිද්‍යාලය, ශ්‍රී ලංකාව

පශ්චාත් යුද්ධ සමයේ දේශීය කුටුම්භය කෙරෙහි ඇති වූ ආර්ථිකමය පීඩනය සමකාලීන ස්වභාවය වේදිකා නාට්‍ය මගින් නිරූපණය වීම පිළිබඳ අධ්‍යයනයක්. (තෝරාගත් ස්වභාවය නාට්‍ය පිටපත් ඇසුරින්)

බණ්ඩාර පී. ජී. සී. එම්. ටී.^{1*}

දශක තුනක් තිස්සේ පැවති යුද්ධයේ නිමාවත් සමඟ ඇති වූ පශ්චාත් යුද්ධ සමය මෙරට සමාජ, සංස්කෘතික, දේශපාලන හා ආර්ථික වශයෙන් සුවිශේෂී විචල්‍යතා රැසක් ඇති වූ කාල පරාසයක් වශයෙන් පිළිගැනෙයි. මේ අතුරින් සමාජයේ කුඩා ම ඒකකය වන කුටුම්භය කෙරෙහි බලපෑ ආර්ථිකමය පීඩනය සුවිශේෂී ය. යුද්ධයේ නිමාවත් සමඟ වේගවත් සංවර්ධනයක් සිදු වුවත් දිගින් දිගට ම මුදල් සංසරණය වූයේ විෂමාකාරී ආකාරයටයි. අවිධිමත් ආර්ථික පාලනය අදාළවන දේශය දැඩි ආර්ථික පීඩාවකට ලක් කර ඇති අතර එහි සෘජු බලපෑම කුටුම්භයට බලපෑ බවක් හඳුනාගත හැකියි. ආකෘතිය මෙන් ම අන්තර්ගතයෙන් ද න්‍යායාත්මකව හා ප්‍රායෝගිකව ද අත්‍යන්තයෙන් ම මිනිසා සහ මිනිස් ජීවිතය සමඟ හැඳී වැඩී වර්ධනය වූ සජීවී කලා මාධ්‍යයක් ලෙස නාට්‍ය කලාව හැඳින්විය හැකිය. මෙරට වේදිකා නාට්‍ය ඔස්සේ අතීතයේ සිට ම සමකාලීන සමාජය, මෙන් ම කුටුම්භය කෙරෙහි බලපෑ නොයෙක් සංරචක සාකච්ඡාවලට ලක්කර ඇත. පශ්චාත් යුද්ධ සමයේ ඇති වූ ආර්ථික අර්බුදය පිළිබඳ සවිඥානික වූ සමකාලීන නාට්‍යකරුවන් ඒ ඔස්සේ ලද අනුභූතීන් ස්වකීය නිර්මාණ සඳහා විෂය කරගත් බව පෙනේ. පශ්චාත් යුද්ධ සමයේ දේශීය කුටුම්භය කෙරෙහි බලපෑ ආර්ථික අර්බුදය සමකාලීන නාට්‍ය කරුවන් ස්වකීය නිර්මාණ ඔස්සේ පිළිබිඹු කළ ආකාරය කෙරෙහි මෙතෙක් අධ්‍යයනයක් සිදු නොවීම මේ පර්යේෂණයේ ගැටලුව වේ. ඒ අනුව පශ්චාත් යුද්ධ සමයේ ඇති වූ ආර්ථික අර්බුදය කුටුම්භවලට ඇතිකළ බලපෑම හඳුනා ගැනීම හා තත් සමයේ නාට්‍ය කරුවන්ගේ නාට්‍ය තේමා අධ්‍යයනය කිරීම මෙම අධ්‍යයනයේ අරමුණු වේ. මෙහි දී ගුණාත්මක පර්යේෂණ ක්‍රමවේදය භාවිතයට ගැනිණ. එහි දී පුස්තකාල විමර්ශනය හා ක්ෂේත්‍ර අධ්‍යයනය මගින් දත්ත රැස්කිරීම සිදු කළ අතර සමකාලීන ව වේදිකා ගත වූ අබිල සපුමල්ගේ 'හිනාවෙලා මිනිත්තුවක්' (2017) රාජීන දිසානායකගේ 'නැතුවම බැරි මිනිහෙක්' (2017) කපිල කුමාර කාලිංගගේ 'බැංකු වීරයා' (2018) යන නාට්‍ය කෘති ත්‍රිත්වය සමීප කියැවීමකට ලක් කළේය. ඒ ඔස්සේ දත්ත විශ්ලේෂණය සිදුවිය. පශ්චාත් යුද්ධ සමයේ ඇති වූ අවධිමත් ආර්ථික කළමනාකරණය හා ඇතිවෙමින් පැවති ආර්ථික අර්බුදය පොදුජන ජීවිතයේ අපේක්ෂා සමඟ සිදුකළ ගනුදෙනුව විවිධ දෘෂ්ටිකෝණ ඔස්සේ කියැවීමට ලක්කිරීමට සමකාලීන නාට්‍ය කරුවන් සමත්ව ඇති ආකාරයත්, සමකාලීන නාට්‍යවේදියා කෙතරම් දුරට තමා ජීවත් වන සමාජයේ තත්‍ය ස්වරූපය තේරුම් ගෙන තිබෙන ආකාරයත් මෙහි දී අනාවරණය කරගත හැකිවිය. මෙම නව සමාජ අර්බුද තේරුම් ගැනීමට සමකාලීන නාට්‍යකරුවන් භාවිත කළ නාට්‍යමය සංදර්භ අධ්‍යයනය කිරීම, මෙන් ම නාට්‍යවේදියා සමාජ යාන්ත්‍රණය විවේචනය කරමින් මාර්ග දර්ශනය දැක්වීමේ විභව ගුණය ඇත්තෙකු ලෙස දැක් වූ බුහුටි බව හඳුනා ගැනීම මෙම අධ්‍යයනයේ සුවිශේෂීතාවයි.

මූලාශ්‍ර : පශ්චාත් යුද්ධ සමය, ආර්ථික පීඩනය, සජීවී කලා මාධ්‍ය, නාට්‍යයේ සංදර්භය, කුටුම්භය

¹ Faculty of Graduate Studies, University of Kelaniya, Sri Lanka
*chamithmanoj@gmail.com

කොරියානු භාෂාවේ සහ සිංහල භාෂාවේ රූපී පිළිබඳ කුලනාත්මක අධ්‍යයනයක්

රණවීර ආර්. එල්.^{1*}

කොරියානු භාෂාවේ "관-영-어" (gwan-yong-eo) යනු පද දෙකකට වැඩි සංඛ්‍යාවක් එකතු වී නිර්මාණය වන ව්‍යංග්‍යාර්ථවාචී ප්‍රකාශ වේ. මේවා සිංහල භාෂාවේ ඉඟිවැකි හා රූපී සමඟ සැසඳෙන අතර, ඒවා විදේශ භාෂකයින්ට තේරුම් ගැනීමට ද අපහසු බවක් හඳුනාගත හැකිය. ලංකාවේ කොරියානු භාෂා අධ්‍යාපනය තුළ වුව ද "관-영-어" පිළිබඳ අධ්‍යයනයට අවස්ථාව හිමි වන්නේ ඉතා අඩු වශයෙනි. මෙවැනි අධ්‍යයනයක් මෙතෙක් සිදුව ඇති බවක් හඳුනාගත නොහැකිය. මෙම පර්යේෂණයේ ප්‍රමුඛ අරමුණ වන්නේ ලංකාවේ කොරියානු භාෂා ඉගෙනුම්, ඉගැන්වීම් ක්‍රියාවලියේ ප්‍රයෝජනයට සිංහල හා කොරියානු රූපී ලැයිස්තුවක් සකස් කිරීමයි. පර්යේෂණයේ අරමුණ සාක්ෂාත් කරගැනීම සඳහා දැනට භාවිත වන සියලු කොරියානු රූපී යොදා ගැනීම යෝග්‍ය නමුත් එය ප්‍රායෝගික නොවන බැවින් ඒ සඳහා Danielle O. Pyun මහතාගේ '500 Common Idioms' නම් ග්‍රන්ථය සහ Gao Shan ගේ 'චීන ජාතිකයන් සඳහා කොරියානු රූපී ලැයිස්තුවක් සකස් කිරීම හා ඉගෙනුම් ක්‍රමවේද' නම් කොරියානු බසින් ලිඛිත පශ්චාත් උපාධි පර්යේෂණ වාර්තාව ආශ්‍රිතය. මෙහි ඇති කොරියානු රූපී අතුරින් අහඹු ලෙස තෝරා ගත් 200ක ලැයිස්තුවක් සකස් කොට එහි ඇතුළත් කොරියානු රූපී, සිංහල රූපී සමඟ සසඳා ඉගෙනුම් හා ඉගැන්වීම් ක්‍රියාවලියට පහසු පරිදි A,B,C,D ලෙස කොටස් (මට්ටම්) 4කට වර්ග කෙරුණි. එනම්: A- සමානාර්ථ දෙන සිංහල හා කොරියානු රූපී, B- රූපීයේ අර්ථය සමාන නමුත්, වැකියේ වාච්‍යාර්ථයේ අර්ථයක් පමණක් සමාන සිංහල හා කොරියානු රූපී, C- අර්ථයන් සමාන වුව ද වැකි එකිනෙකට වෙනස් සිංහල හා කොරියානු රූපී සහ D- සිංහල භාෂකයින්ට ආගන්තුක කොරියානු භාෂාවට ආවේණික රූපී යනුවෙනි. මෙහි දී A- 23, B- 17, C- 80, D- 80 වශයෙන් ප්‍රමාණ වන ලැයිස්තුවක් සැකසීය. මෙමගින් ඉගෙනුම්, ඉගැන්වීම් ක්‍රියාවලියට පමණක් නොව කොරියානු භාෂාව හදාරන ලාංකිකයන්ට ද "관-영-어" පිළිබඳ දැනුම ලබා ගැනීමට, දෙරටේ සංස්කෘතික ලක්ෂණ හඳුනා ගැනීමට මෙන් ම එහි විවිධතා පිළිබඳ ව ද අවබෝධ කර ගැනීමට හැකියාව ලැබීම මේ පර්යේෂණයේ ප්‍රතිඵලයි.

මුඛ්‍ය පද : 관-영-어, කොරියානු රූපී, සිංහල රූපී, රූපී ලැයිස්තුව, සංස්කෘතික ලක්ෂණ

¹ University of Kelaniya, Sri Lanka
*rasaralama@gmail.com

“නෙළම” සමකාලීන දේශපාලනික බලය සහ දෘෂ්ටිවාදයන් අර්ථගැන්වීමේ සංකේතයක් ලෙස; කොළඹ නාගරික දෘශ්‍ය අවකාශය ඇසුරෙන්

ධම්මි සී. පී.^{1*}

පසුගිය දශකය තුළ කොළඹ නාගරික භූමි අවකාශය ශීඝ්‍ර ලෙස සංවර්ධනය විය. එම නාගරික පරිසරය තුළ භෞතිකව ගොඩනගන ලද ගොඩනැගිලි, මංමාවත් මෙන්ම සංස්කෘතිකමය වශයෙන් ගොඩනංවනු ලබන අවකාශයන් මගින් එය දෘශ්‍යමාන වේ. ඒවා කොළඹ නාගරික අවකාශයේ ස්වරූපය වෙනස්වීමට බලපෑම සුළුපටු නොවේ. මෙම පර්යේෂණයෙන් අවධානයට යොමු වනුයේ කොළඹ නාගරික අවකාශය තුළ ගොඩනගා තිබෙන සහ ගොඩනැංවීමට යෝජිත ගොඩනැගිලි සහ මංමාවත් මෙන්ම කොළඹ නාගරික අවකාශය කේන්ද්‍ර කොටගෙන ගොඩනැගුණු සමාජ, දේශපාලන හා සංස්කෘතික සංවිධානය කෙරෙහිය. එහි විශේෂත්වය වනුයේ දේශපාලනික බලය සහ දෘෂ්ටිවාදයන් මත පිහිටා යථෝක්ත අංශවලට ‘නෙළම’ සංකේතයක් ලෙසට නාමකරණය කර තිබීමය. සන්නිවේදන කුළුණක් ලෙස නම් කර ඇති නෙළමී කුළුණ, නෙළමී පොකුණ රංග ශාලාව, යෝජිත කටුනායක ගුවන් තොටුපලේ ආකෘතිය ඉන් සමහරෙකි. එමෙන්ම මෑත දශක කිහිපය තුළ කොළඹ කේන්ද්‍රීයව ගොඩනැගුණු සමාජ, දේශපාලන හා සංස්කෘතික සංවිධාන මෙන්ම කණ්ඩායම් නාමකරණයේ දී ද නෙළම සංකේතයක් ලෙස භාවිත කර ඇත. සුදු නෙළමී ව්‍යාපාරය, මානෙල් මල් ව්‍යාපාරය, ශ්‍රී ලංකා පොදුජන පෙරමුණ, පිවිතුරු හෙළ උරුමය වැනි සංවිධාන ඉන් කිහිපයකි. එම සංවිධාන ප්‍රවර්ධනය පිණිස නෙළම සංකේතවත් වන බැනර්, නාම පුවරු, දැන්වීම් හා කොඩි යනාදිය නාගරික අවකාශ තුළ ප්‍රදර්ශනය විය. එයින් ප්‍රත්‍යක්ෂ වනුයේ මෙවැනි ක්‍රියාකාරකම් හුදු අහඹුවක් නොව සවිඥානික දේශපාලනික ක්‍රියාදාමයක් බවයි. නෙළම සංකේතවත් කරන සංඥාව පොදු නාගරික අවකාශය තුළ දැක ගැනීම නිර්වචනය කළ හැකි වන්නේ බලයට සාපේක්ෂවය. එසේ වනුයේ බලය හරහා අවකාශය අර්ථ ගැන්වීමත් අවකාශය හරහා බලය තීරණය වීමත් හේතු කොටගෙනය. මෙසේ බලය පිළිබඳ හැඟීමක්, දෘෂ්ටිවාදයක් අර්ථ ගැන්වීමේ සංකේතයක් ලෙස නෙළම භාවිතයට ගැනීමේ පසුබිම පිළිබඳ ව විමර්ශනයක් මෙතෙක් සිදුව නැති අතර මේ පර්යේෂණයේ ගැටලුව ද එය වේ. ඒ අනුව මෙහි අරමුණ වන්නේ නෙළම නමැති සංකේතය කොළඹ නාගරික අවකාශයේ බලය සහ දේශපාලන දෘෂ්ටිවාදයන් අර්ථ ගැන්වීම කෙරෙහි කුමන ආකාරයේ බලපෑමක් සිදුකර තිබේද යන්නය. එමෙන්ම ශ්‍රී ලාංකේය දෘශ්‍ය කලා ඉතිහාසයේ කාලානුරූපී වෙනස්වීම් කෙරෙහි නෙළම යන සාධකය කෙසේ බලපෑ ඇද්දැයි විමර්ශනය කිරීම මෙහි තවත් අරමුණකි.

මුඛ්‍ය පද : දේශපාලනය, බලය, දෘෂ්ටිවාද, සංකේතාර්ථ, අවකාශය

¹ Faculty of Graduate Studies, University of Kelaniya, Sri Lanka
*vinodanijayawardana1210@gmail.com

දෙමළ ක්‍රියා මූල වර්ගීකරණය හා අතීතකාල ක්‍රියා පද සාධනය පිළිබඳ අධ්‍යයනයක්

උඩගලදෙණියේ ධම්මවිමල හිමි

සිංහල භාෂාව ඉන්දු ආර්ය භාෂා පවුලටත්, දෙමළ භාෂාව ද්‍රවිඩ භාෂා පවුලටත් අයත් බව විද්වතුන් විසින් මේ වන විට තහවුරු කරනු ලැබ ඇත. එමෙන් ම ලෝකයෙහි බහුලව ව්‍යවහාර කෙරෙන භාෂා තිහ අතරට දෙමළ භාෂාව ඇතුළත්ව තිබීමෙන්ද එහි වැදගත් බව මෙන් ම භාවිතය පිළිබඳ ව අවබෝධයක් ලබාගත හැකිය. ශ්‍රී ලාංකේය සමාජ ජන කණ්ඩායම් පදනම් කොටගෙන සකසා ඇති රාජ්‍ය භාෂා ප්‍රතිපත්තියට අනුව ශ්‍රී ලංකාවේ ජාතික භාෂා ලෙස සිංහල මෙන් ම දෙමළ යන භාෂා ද්විත්වයම නම් කර තිබේ. සිංහල කථාකරන ජනයා බහුතරයක් වෙසෙන ලංකාවේ, දෙමළ මාතෘ භාෂාව කොටගත් පිරිසක්ද ජීවත් වෙති. පසුගිය දශක කිහිපය තුළ ශ්‍රී ලංකාව තුළ උද්ගතව තිබූ ජනවාර්ගික අර්බුදය කෙරෙහිද 'භාෂාව නොදැනීම' යන කාරණය ප්‍රධාන සාධකය බවට පත්ව තිබූ බව අමුතුවෙන් සඳහන් කළ යුතු නැත. ඒ කෙසේවුවද වර්තමානයේදී ශ්‍රී ලංකාවේ සිංහල මාතෘ භාෂකයා දෙමළ බසත්, දෙමළ මාතෘ භාෂකයා සිංහල බසත් ඉගෙනීමට පෙළඹී ඇත. තත් භාෂාධ්‍යයනය සම්බන්ධයෙන් ජාතික මට්ටමේ සිට බිම් මට්ටම දක්වා ඇතිවී තිබෙන ප්‍රබෝධය හා ඒ හා සම්බන්ධව දක්වන ආකල්පය අන්තර්දාමය වඩා සමාජය තුළ කථාබහට ලක්ව තිබේ. එබැවින් මෙම අධ්‍යයනයේ දී සිංහල මව්භාෂකයා දෙවන බසක් ලෙස දෙමළ ඉගෙනීම සම්බන්ධයෙන් සාකච්ඡාවට ලක් කෙරේ. දෙමළ භාෂාවේ ව්‍යාකරණ අංශ සමූහයකට ප්‍රධාන වන පිණිසාර්ථ ක්‍රියා රූපය ඉතාමත් වැදගත් ක්‍රියාරූපයක් වන අතර එය දෙමළ භාෂාවේ බොහෝ ක්‍රියාරූප සාධනයට බෙහෙවින්ම උපකාරී වේ. එකී ක්‍රියාරූප සාධනයට හැකියාව ඇති කරගැනීම, භාෂා භාවිතයට බෙහෙවින් අවශ්‍ය වේ. එබැවින් මෙම අධ්‍යයනයේදී අරමුණ වන්නේ එම ක්‍රියා රූප සාධනය සිදුවන ආකාරය පැහැදිලි කිරීමයි. එමනිසා මෙහිදී ක්‍රියා මූලයේ රූපීය ලක්ෂණය පදනම් කරගෙන දෙවන භාෂාවක් ලෙස දෙමළ භාෂාව ඉගැන්වීමේදී ක්‍රියා පද භාවිතය, ඉගැන්වීමේ ක්‍රමවේද සකස් කළ යුතු ආකාරය පිළිබඳ ව මෙතෙක් අධ්‍යයනයක් සිදුව ඇති බවක් හඳුනා ගත නොහැකි අතර එය පර්යේෂණ ගැටලුව ද වේ. නැන්නුල් ආදී සාම්ප්‍රදායික දෙමළ ව්‍යාකරණය තුළ දෙමළ ක්‍රියාපද වර්ගීකරණයක් දැකගත නොහැකිය. එහෙත් නූතන බටහිර දෙමළ ව්‍යාකරණඥයන් වන බේස්කි (Beschi), රෙනියස් (Rhenius), ග්‍රෝල් (Graul), පෝප් (Pope) හා ආර්ඩන් (Arden) යන අය විසින් දෙමළ ක්‍රියා මූල වර්ගීකරණය ආකාර කිහිපයකින් සිදු කර ඇති අතර දෙවන බසක් ලෙස දෙමළ ඉගැන්වීමේදී දෙමළ භාෂාව පිළිබඳ ප්‍රාමාණික උගතුන් වන මහාචාර්ය සුසින්දිරාජා (Nguhrphpah; RrPe;jpuuhrh), මහාචාර්ය සන්මුහදාස් (Nguhrphpah; rz;Kfjh;), මහාචාර්ය එම්. ඒ. කුන්මාන් (Nguhrphpah; vk;. V. E/khd;), වැනි දෙමළ ව්‍යාකරණඥයන් වෙතම ක්‍රමවේදයක් අනුගමනය කරන ආකාරය දක්නට ලැබේ. එමෙන්ම දෙමළ පිළිබඳ ප්‍රාමාණික උගතෙකු වන සිංහල මාතෘ භාෂක වර්ග ප්‍රභාත් විජයසිංහ මහත්මා දෙමළ ක්‍රියා මූලය ප්‍රධාන වර්ගීකරණ දෙකක් ඔස්සේ සාකච්ඡා කර තිබෙනු දැකගත හැකිය. මෙවැනි ක්‍රියා වර්ගීකරණයන් අතර ප්‍රබල ක්‍රියා "(Strong verbs)" දුබල ක්‍රියා (Weak verbs) යන ක්‍රියා වර්ගීකරණයට ප්‍රධාන තැනක් හිමිව ඇත. මේ අධ්‍යයනයේ දී අහඹු ලෙස තෝරාගත් දෙමළ ක්‍රියා මූල 100ක රූපීය ලක්ෂණ පදනම් කොටගෙන අධ්‍යයනය කාර්යයෙහිලා පහසු වන අන්දමට එකී ක්‍රියා මූල වර්ගීකරණය කොට අතීතකාල ක්‍රියා රූප සාධනය කවරාකාරව සිදුකළ යුතුද යන්න මෙහිදී විමර්ශනයට ලක්විය.

මුඛ්‍ය පද : අතීත කාලය, ක්‍රියාමූලය, දෙමළ භාෂාව, දෙවන බස, පිණිසාර්ථ ක්‍රියා රූපය, සිංහල මාධ්‍යය ශිෂ්‍යයන්

වර්තමාන ශ්‍රී ලංකාවේ අර්බුදකාරී තත්ත්වය හමුවේ ප්‍රායෝගිකව විදේශ භාෂා ඉගෙනීමට පවතින අභියෝග, ගැටලු හා ඒ සඳහා ගතහැකි විසඳුම් පිළිබඳ ව වාග්විද්‍යාත්මක අධ්‍යයනයක්

ජයසිංහ එස්. ජේ. පී. පී.^{1*}, නිලන්ත ඒ. එල්.

වර්තමාන ශ්‍රී ලංකාවේ ආර්ථික, සමාජීය හා දේශපාලනික අස්ථාවරත්වයන් සමග ඇති වූ අර්බුදකාරී තත්ත්වය හමුවේ තරුණ, වැඩිහිටි බොහෝ පිරිස් තමාගේ හා තම ප්‍රියයන්ගේ අභිවෘද්ධිය මෙන් ම අනාගත සුරක්ෂිත බව උදෙසා විදේශ ගතවීම වර්තමානයේ දැකිය හැකි නව ප්‍රවණතාවකි. එහි දී ඔවුන්ට ප්‍රධාන අභියෝගයක් වනුයේ විදේශ භාෂා ප්‍රවීණත්වයයි. ඔවුන් විදේශ ගතවීමේ අරමුණ අධ්‍යාපනය හෝ වෘත්තීය හෝ වෙනත් අවශ්‍යතාවක් වූවත් එහි දී මූලිකව අදාළ රටේ භාෂාව නිවැරදිව හා ප්‍රායෝගිකව හැසිරවීමේ හැකියාව අත්‍යවශ්‍ය ය. විදේශීය භාෂාවක් ඉගෙන ගැනීම සඳහා පාරිසරික හා භෞතික සාධක සපයා ගැනීම දුෂ්කර වීම පොදු කරුණකි. මෙවන් පසුබිමක විදේශීය භාෂාවක් ඉගෙනීමේ දී විවිධ භාෂාමය ගැටලු ඇති වීම දක්නට ලැබේ. වර්තමාන ගෝලීය රැකියා වෙළෙඳ පොළෙහි වෘත්තීය අවස්ථා සුලභ ය. එහි නිරත වීමට නම් අදාළ විදේශ භාෂා භාවිතයෙහි හැකියාව මෙන් ම දැනුවත් බව අත්‍යවශ්‍ය කරුණක් වන අතර මෙරට පුද්ගලයින්ට එම අතහි අවස්ථා සඳහා අයදුම් කිරීමට ප්‍රමාණවත් විදේශ භාෂා ප්‍රවීණත්වයක් නොමැති කම ප්‍රධාන අභියෝගයකි. විදේශ ගත වීමේ දී භාෂා ප්‍රවීණතාව සඳහා විදේශ භාෂා ප්‍රවීණතා පරීක්ෂණ පවත්වනු ලබයි. ඒ පරීක්ෂණවලින් සමත් වීම හෝ අසමත් වීම මත බොහෝ පුද්ගලයින්ට විදේශ ගත වීමේ අවස්ථාව ලැබීම හෝ නොලැබීම සිදුවෙයි. වර්තමාන ගෝලීය ආර්ථික ප්‍රවණතා හා ශ්‍රී ලංකාවේ ආර්ථික ප්‍රමුඛතා හමුවේ මෙරට පාසල් මට්ටමේ සිට විදේශ භාෂා ඉගැන්වීම සඳහා විෂය මාලාවට විදේශ භාෂා ඇතුළත් කිරීමත් ගුරු ව්‍යවස්ථාවට අනුව ගුරුවරුන් අනියුක්ත කිරීමත් සිදු වේ. විශ්වවිද්‍යාලයන්හි විදේශ භාෂා ඉගෙනීම සඳහා නූතන භාෂා ඒකක ස්ථාපිත කිරීම තුළින් පුළුල් ඉඩ ප්‍රස්ථා ද සලසා දී තිබේ. තව ද රාජ්‍ය ආයතන මෙන්ම අර්ධ රාජ්‍ය, පෞද්ගලික ආයතන රැසක් විදේශ භාෂා ඉගෙන ගැනීම සඳහා සේවා සපයයි. නමුත් ගැටලුව වනුයේ ඒවායේ ප්‍රමිතිය, ප්‍රායෝගික ක්‍රියාකාරීත්වය, මෙරට පුද්ගලයින්ට ඒවායින් අදාළ සේවාව සැපයෙනවා ද සහ ඒවා කොතරම් දුරට සාර්ථකත්වයකින් යුක්ත ද යන්නයි. බොහෝ විට ශ්‍රී ලංකාවේ අධ්‍යාපන ක්‍රමය පිළිබඳව විවිධ විවේචන එල්ල වනුයේ ද එය කෙතරම් දුරට ප්‍රායෝගික ද යන්න සාකච්ඡා කිරීමත් සමග යි. එබැවින් වර්තමාන අර්බුදකාරී තත්ත්වය හමුවේ ප්‍රායෝගිකව විදේශ භාෂා ඉගෙනීම සඳහා පවත්නා අභියෝග මොනවා ද ගැටලු හා ඒවාට විසඳුම් මොනවා ද යන්න අරමුණු කර ගෙන වාග්විද්‍යාත්මක අධ්‍යයනයක් සිදු කිරීම කාලීන වශයෙන් ද වැදගත් අවශ්‍යතාවකි. මෙම පර්යේෂණය විදේශ භාෂා ඉගෙනීමේ දී අනුගත ව්‍යවහාරික වාග්විද්‍යාත්මක භාෂා ඉගෙනුම් හා ඉගැන්වීම් න්‍යායයන් ඔස්සේ, වයස අ.වු. 18-35ත් අතර විදේශ ගතවීමට බලාපොරොත්තුවෙන් විදේශ භාෂා ඉගෙන ගනු ලබන හා දැනටමත් විදේශ ගතව සිටින සීමිත ලාංකිකයින් කණ්ඩායම් දෙකක් යොදා ගනිමින්, විදේශ සේවා අමාත්‍යාංශය යටතේ ලියාපදිංචි නියෝජිත ආයතන හා ඊට අනුබද්ධ විදේශ භාෂා මධ්‍යස්ථානවලින් තොරතුරු ලබා ගනිමින්, ප්‍රමාණාත්මක හා ගුණාත්මක මිශ්‍ර ක්‍රමවේදයක් ඔස්සේ සිදු කර ඇත. මෙම පර්යේෂණයෙන් වර්තමාන අර්බුදකාරී තත්ත්වය හමුවේ මෙරට පුද්ගලයින්ට විදේශගත වීමේ දී ප්‍රායෝගිකව විදේශ භාෂා ප්‍රවීණත්වය ලබා ගැනීමේ අභියෝග හා ගැටලු පවතින බවත්, මේ සඳහා දිවයින පුරා විසිරී පවතින විදේශ භාෂා උගන්වන සම්පත්දායකයින්ගේ සංවිතයක් ගොඩනගා සුදුසුකම් හා පළපුරුද්ද පිළිබඳ පැහැදිලි තොරතුරු නිරීක්ෂණය කර, විදේශ සේවා අමාත්‍යාංශය, රාජ්‍ය භාෂා දෙපාර්තමේන්තුව හෝ රජයේ ආයතනයක් මගින් ඒවා ලියාපදිංචි කිරීම මෙන් ම නියාමනය කිරීමත් සිදුවිය යුතු බවත්, මේ සඳහා ජාතික ප්‍රතිපත්තියක් සකස් කළ යුතු බවත්, අවශ්‍ය තාක්ෂණික සම්පත් ද ලබා දෙමින් ජාත්‍යන්තර සහායන් ලබාගත යුතු බවත්, විදේශ භාෂා ඉගැන්වීම සඳහා ජාත්‍යන්තර පිළිගත් ක්‍රමවේද මෙන් ම වාග්විද්‍යාත්මක ක්‍රමවේද යොදාගත යුතු බවත් නිගමන සහ යෝජනා වශයෙන් ඉදිරිපත් කළ හැකිය. එය මෙරට අර්බුදකාරී තත්ත්වය මැඩලීමට මෙන් ම අනාගත සුබසිද්ධිය උදෙසා භාෂාත්මක වශයෙන් පමණක් නොව ජාතික මට්ටමෙන් සිදුවන වන වැදගත් ක්‍රියාවලියකි.

මුඛ්‍ය පද : ශ්‍රී ලංකාව, අර්බුදකාරී තත්ත්වය, විදේශ භාෂා ඉගෙනීම, ප්‍රායෝගික, අභියෝග, ප්‍රශ්න හා ගැටලු, විසඳුම්

¹ කැලණිය විශ්වවිද්‍යාලය, ශ්‍රී ලංකාව
*Pradeepapriyadarshani10@gmail.com

සිංහල මව් භාෂිකයන් දෙවන භාෂාව ලෙස ඉංග්‍රීසි ඉගෙන ගැනීමේ දී මුහුණ දෙන ශබ්ද විද්‍යාත්මක හා ව්‍යාකරණමය ගැටලු පිළිබඳ ව තුල්‍යාත්මක අධ්‍යයනයක්

බණ්ඩාර ටී. එම්. බී.¹

මිනිසාගේ ජීවිතය හා බැඳුණ විවිධ අවශ්‍යතා සපුරා ගැනීමේ දී අවශ්‍ය වන අදහස් ප්‍රකාශ කරමින් එකිනෙකා අතර සන්නිවේදනයේ යෙදීමට අවශ්‍ය වන ප්‍රධානතම මාධ්‍ය භාෂාවයි. එනිසාම ලෝකයේ විවිධ භාෂා නිර්මාණය වී තිබේ. ඇතැම් භාෂා භාවිත නොකරම මියගොස් ඇති අතර ඇතැම් භාෂා ක්‍රමිකව වර්ධනය වී ඇත. ඒ අතරින් ඉංග්‍රීසි සුවිශේෂී වන අතරම ලෝක සන්නිවේදන භාෂාව ලෙස ඉංග්‍රීසි භාෂාව යොදාගැනීමත් සමග දෙවන බස ලෙස ඉංග්‍රීසි ඉගෙනගැනීම හා ඉගැන්වීම ලෝකයේ බොහෝ රටවල සිදුකරනු ලබයි. මේ නිසාම ඉංග්‍රීසි බස ඉගැන්වීම පිළිබඳව පර්යේෂණ සිදුකර ඇත. මෙම පර්යේෂණය මගින් අධ්‍යයනය කරනු ලබන්නේ දෙවන බස ලෙස ඉංග්‍රීසි බස ඉගෙනගන්නා සිංහල බසිකයන් මුහුණ දෙන ශබ්ද විද්‍යාත්මක හා ව්‍යාකරණමය ගැටළු පිළිබඳවය. සිංහල පිරිස් ඉංග්‍රීසි ඉගෙනගැනීමේදී අක්ෂර, වචන, වාක්‍ය, හා ශබ්ද ආශ්‍රිතව ගැටළු තිබේද, එම ගැටළු මොනවාද, යන්න මෙහිදී අධ්‍යයනය කරයි. ඒ අනුව වයඹ පළාතේ දුෂ්කර පාසල්වල සිංහල දරුවන්ට උගන්වන ඉංග්‍රීසි භාෂා ගුරුවරුන් සියදෙනකු සමග සම්මුඛ සාකච්ඡා පවත්වමින් මෙම ගැටළු හඳුනාගැනින. එම ගැටළු සිංහල භාෂාවේ ලක්ෂණයන් සමග තුල්‍යාත්මකව අධ්‍යයනය කරන ලදී. මෙය ගුණාත්මක පර්යේෂණයකි. මෙ මගින් ඉංග්‍රීසි ඉගැනීමේදී සිංහල මව් බසිකයන් සඳහා බලපාන ශබ්ද විද්‍යාත්මක හා ව්‍යාකරණමය ගැටළු හඳුනාගත් අතර ඒ සඳහා බලපා ඇති කරුණු අධ්‍යයනය කර ඇත. මෙම අධ්‍යයනයට අනුව ඉංග්‍රීසි භාෂාවට අනන්‍යවූ යම් යම් ව්‍යාකරණමය ව්‍යාකූලතා, තත්සම හා තත්ව වචන බහුලවීම, අක්ෂර වින්‍යසයේ පවතින සීමිතකම් ඉංග්‍රීසි ඉගෙනගැනීමට බාධාවන් ඇතිකරයි.

මුඛ්‍ය පද : ඉංග්‍රීසි භාෂාව, සිංහල භාෂාව, දෙවන භාෂාව, ව්‍යාකරණමය ගැටළු, ශබ්ද විද්‍යාත්මක

¹University of Kelaniya, Sri Lanka

නවකතා ඇසුරෙන් බිහිවූ ශ්‍රී ලාංකේය සිංහල වෘත්තාන්ත ටෙලි නාට්‍ය කලාව පිළිබඳ අධ්‍යයනයක් (ක්‍රි. ව. 1982 - ක්‍රි. ව. 2002 දක්වා විකාශය වූ නිර්මාණ ඇසුරෙන්)

විජේසුන්දර ඩබ්ලිව්. එල්. එස්. එස්.

නවකතා පාදකව නිර්මාණය කරන ලද ශ්‍රී ලාංකේය සිංහල රූපවාහිනී ටෙලි නාට්‍යය සම්බන්ධයෙන් සිදුකළ පර්යේෂණයකි. රූපවාහිනී ටෙලිනාට්‍ය මෙරට තුළ ඇරඹුණ ක්‍රි. ව. 1982 සිට වසර 20ක් දක්වා කාලය තුළ විකාශනය වූ ටෙලි නාට්‍ය මේ සඳහා පාදක විය. රූපවාහිනී මගින් ප්‍රදර්ශිත සියලු නාට්‍ය පොදුවේ ටෙලිනාට්‍ය වශයෙන් හැඳින්විය හැකිය. ටෙලි නාට්‍යයක ගුණාත්මක බව, නිර්මාණශීලී බව, රූපවාහිනී ප්‍රේක්ෂකයාට මෙන්ම අධ්‍යක්ෂවරයාට ද එක ලෙස බලපායි. මෙම අධ්‍යයනය කිරීමේ ප්‍රධාන අරමුණ වූයේ, ක්‍රි. ව. 1982 - 2002 කාලය තුළ නවකතා ආශ්‍රිත ව බිහි වූ ශ්‍රී ලාංකේය ටෙලි නාට්‍ය හඳුනාගැනීමටත්, ටෙලි නාට්‍ය සඳහා නවකතා භාවිත කිරීමේ සාර්ථක අසාර්ථක බව හඳුනාගැනීමටත්, නවකතාව ටෙලි පිටපතක් ලෙස නිර්මාණය කිරීමේ දී අධ්‍යක්ෂවරයා විසින් සැලකිය යුතු කරුණු මොනවාදැයි අධ්‍යයනය කිරීමටයි. "ටෙලිනාට්‍ය හා නවකතාව යනු කලා මාධ්‍ය දෙකකි. ඒ ඒ මාධ්‍යයට ආවේණික ශාක්‍යතා හා ලක්ෂණ හිමිය" යන්නත් "මුල් කෘතිය වෙනස් කිරීම කෙරෙහි ටෙලි නාට්‍ය නිර්මාණකරුට අවශ්‍යතාවක් සහ අයිතියක් ඇත" යන්නත් මෙහි උපකල්පන වේ. මූලික ක්‍රමවේද 5ක් මත මෙහි දී පර්යේෂණය දියත් කරන ලද අර ටෙලිනාට්‍ය හා නවකතාව වෙන් වෙන් වශයෙන් නරඹමින් හා කියවමින් මූලාශ්‍ර අධ්‍යයනය සිදුවිය. ක්‍රි. ව. 1982 - 2002 කාලය තුළ විකාශනය වී ඇති එම වසරවල සම්මාන උළෙලවල ලද සම්මාන අනුව තෝරාගත් යශෝරාවය, ගම්පෙරළිය, එකගෙයි කුරුල්ලෝ, වර්ත තුනක්, බැඳ්දෙගෙදර, නිසලවිල කෘති හය මෙහි දී අධ්‍යයනයට යොදා ගැණින. එම ටෙලිනාට්‍ය අධ්‍යක්ෂවරයා, නවකතා රචකයා හා තිර පිටපත් රචකයා සමඟ සම්මුඛ සාකච්ඡා කිරීම දෙවැනි ක්‍රමවේදය යි. ප්‍රශ්නාවලි ක්‍රමවේදයක් ඔස්සේ ප්‍රේක්ෂක හා අධ්‍යක්ෂ ප්‍රතිචාර විමසීමට ලක් කරන ලදී. ක්‍රි. ව. 1982 සිට රූපවාහිනී හා සාහිත්‍ය සම්මාන ලැයිස්තුවක් පරිශීලනය මත දත්ත පරිශීලනය කිරීම අනෙක් ක්‍රමවේදය ලෙසත් ක්‍රි. ව. 1982 දක්වා ටෙලිනාට්‍ය විකාශය වූ ප්‍රධාන නාලිකා වන ජාතික රූපවාහිනිය හා ස්වාධීන රූපවාහිනිය යන ආයතන අධ්‍යයනයක් කිරීමත් සිදුවිය. දත්ත විශ්ලේෂණයෙන් අනතුරුව අනාවරණය වූ කරුණු නම්, 1982- 2002 දක්වා කාලය තුළ විකාශය වූ ටෙලිනාට්‍ය අතරින් තම කතා තේමාව ලෙස නවකතාව තෝරාගෙන ඇති ටෙලිනාට්‍ය ප්‍රමාණය 40ක් වේ. ටෙලි නාට්‍ය අධ්‍යක්ෂවරුන්ගේ ප්‍රතිචාර අනුව නවකතා පාදක කරගත් නිර්මාණ සාර්ථක තත්ත්වයේ පවත්නා බව නිගමනය විය. ප්‍රේක්ෂක අදහස් විශ්ලේෂණයෙන් නිගමනය වූයේ මෙහි සාර්ථක අසාර්ථක බව 50% සමාන ලෙස පවතින බවයි.

මුඛ්‍ය පද : රූපවාහිනී ටෙලිනාට්‍ය, නවකතාව, අනුවර්තනය, තිර පිටපත් රචනය, ටෙලි නාට්‍ය අධ්‍යක්ෂ

අපරදිග නාට්‍ය කෘතීවල මව සහ පුතු යන චරිත ද්විත්වයේ නිරූපිත අන්තර් පුද්ගල ගැටුම පිළිබඳ ව අධ්‍යයනයක් (තෝරාගත් නාට්‍ය කෘති ඇසුරිනි)

කෝදාගොඩ කේ. ඒ. ඒ. අයි.

නාට්‍ය බිහිවීමේ මූලික පදනම ගැටුමයි. ගැටුම චරිත මත පදනම්ව සිදු වන හෙයින් කිසියම් පරස්පරතාවක් හෝ ප්‍රතිවිරෝධතාවක් හෝ හේතු කොටගෙන නිර්මාණය වෙයි. නාට්‍යයක දී ගැටෙන්නේ චරිත බව පෙනෙන මුත් එම චරිත නියෝජනය කරන මතවාදයක් හෝ ගුණාංගයක් හෝ ගැටුමට මූලික වෙයි. පුද්ගලයකු තවත් පුද්ගලයකු සමඟ ගැටීම අන්තර් පුද්ගල ගැටුම (Interpersonal Conflict) යනුවෙන් හැඳින්වෙයි. මෙකී අන්තර් පුද්ගල ගැටුම මව සහ පුතු චරිත පාදක කොටගෙන අපරදිග නාට්‍ය කෘතීවල වඩාත් ප්‍රකට ව නිරූපණය වී තිබේ. අපරදිග නාට්‍ය සාහිත්‍යයේ එක් එක් යුගවල ජීවත් වූ නාට්‍ය රචකයින් විසින් රචනා කරන ලද නාට්‍ය කෘතීවල නිරූපිත මව සහ පුතුවන් අන්තර් පුද්ගල ගැටුමට බලපාන සාධක පිළිබඳ ව අධ්‍යයනය කිරීම මෙම පර්යේෂණයේ මූලික අභිමතාර්ථයයි. මෙම අධ්‍යයනය සඳහා යොදාගනු ලබන ප්‍රාථමික ලිඛිත මූලාශ්‍රයන් වන්නේ විලියම් ශේක්ස්පියරගේ Hamlet (කේ. සී. ලියනගේ පරිවර්තනය- හැම්ලට් ඩෙන්මාර්කයේ කුමාරයා), හෙන්රික් ඉබ්සන්ගේ Ghost (සුනිල් විජේසිරිවර්ධන පරිවර්තනය- පුනරාගමන), ඇන්ටන් චෙකොෆ්ගේ The Seagull (ආරියරත්න විතාන පරිවර්තනය- මුහුදු ලිහිණියා), ටෙනිසි විලියම්ස්ගේ The Glass Menagerie (හෙන්රි ජයසේන පරිවර්තනය - පුංචි පළිඟු රැන), යන නාට්‍ය කෘතීවල සිංහල පරිවර්තනයයි. මෙම අධ්‍යයනයේ මූලික ගැටලුව නම් මව්, පුතු අන්තර්පුද්ගල ගැටුම කෙරෙහි බලපාන සාධක කුමක්දැයි හඳුනා ගැනීමයි. යථෝක්ත ගැටලුව කෙරෙහි බලපාන සාධක දෙකක් පවතින බව එහිදී ගම්‍යමාන විය. ඉන් පළමු වැන්න මනෝවිද්‍යාත්මක සාධකය ලෙසත්, දෙවැන්න ආර්ථික හා සමාජ-දේශපාලනික සාධක වශයෙනුත් හැඳින්විය හැකිය.

මුඛ්‍ය පද : චරිත, ගැටුම, අන්තර් පුද්ගල ගැටුම, මනෝවිද්‍යාත්මක සාධක, ආර්ථික හා සමාජ-දේශපාලනික සාධක

**කැලණිය විශ්වවිද්‍යාලයීය විද්‍යාර්ථීන් හින්දී භාෂාව විෂයයක් ලෙස තෝරා ගැනීමේ
ප්‍රවණතාව පිළිබඳ අධ්‍යයනයක්**

අතපත්තු ඒ. එම්. එස්. ජේ. බී.^{1*}

නූතන ඉන්දු ආර්ය භාෂාවක් වන හින්දී භාෂාව ලංකාව තුළ විදේශ භාෂාවක් ලෙස භාවිතයට ගනියි. විශ්වවිද්‍යාල අධ්‍යාපනය තුළ ද හින්දී භාෂාව කැපී පෙනෙන විෂයයක් වී ඇති අතර කැලණිය, ශ්‍රී ජයවර්ධනපුර, සබරගමුව ආදී විශ්වවිද්‍යාලයන්හි ශාස්ත්‍රවේදී ගෞරව උපාධි විෂයයක් ලෙස හින්දී භාෂාව හැදෑරීමේ පහසුකම් ද ඇත. ඒ අතුරෙන් ප්‍රථම සහ එකම හින්දී භාෂා අධ්‍යයනයක් ස්ථාපිත කොට ඇත්තේ කැලණිය විශ්වවිද්‍යාලයේ ය. ක්‍රි.ව.1959 වසරේ දී ප්‍රථමවරට හින්දී භාෂාව උපාධි පාඨමාලා සඳහා ඇතුළත් කරන ලද්දේ, මහාචාර්ය, පූජ්‍ය ආනන්ද කෞශල්‍යයන් හිමිපාණන් විසිනි. ක්‍රි. ව. 1982 වසරේ දී හින්දී භාෂාව සඳහා ශාස්ත්‍රවේදී ගෞරව උපාධි විද්‍යාර්ථීන් බඳවා ගනු ලැබීය. හින්දී භාෂාව පිළිබඳ මෙවන් දීර්ඝ ඉතිහාසයක් ඇති කැලණිය විශ්වවිද්‍යාලය තුළ වර්තමානයේ විද්‍යාර්ථීන් හින්දී භාෂාව තෝරා ගැනීමේ ප්‍රවණතාව පිළිබඳ විමර්ශනය කිරීම මෙම පර්යේෂණයේ අරමුණ යි. අනෙකුත් විදේශ භාෂා සමග සංසන්දනය කර බැලීමේ දී ඇතැම් වර්ෂයන්හි හින්දී භාෂාව තෝරාගන්නා විද්‍යාර්ථීන් ප්‍රමාණය තරමක අඩු-වැඩි වීමක් පෙන්නුම් කරයි. මෙහි පර්යේෂණ ගැටලුව වන්නේ, විශ්වවිද්‍යාලයීය විද්‍යාර්ථීන් කෙතරම් දුරට හින්දී භාෂාව තෝරා ගන්නේද, එසේ තෝරා ගැනීමේ අඩු වැඩි වීම් ඇත්නම් ඒවාට හේතු මොනවාද ආදිය යි. මෙම පර්යේෂණ නියැදිය සඳහා 2020 වර්ෂයේ සිට මේ දක්වා කාලය තුළ කැලණිය විශ්වවිද්‍යාලයේ හින්දී භාෂාව විෂයයක් ලෙස හදාරන සහ හැදෑරූ, ශාස්ත්‍රවේදී ගෞරව උපාධි ප්‍රථම වසර විද්‍යාර්ථීන් සහ ශාස්ත්‍රවේදී සාමාන්‍ය උපාධි ප්‍රථම වසර විද්‍යාර්ථීන් යොදා ගන්නා අතර ප්‍රශ්නාවලි මඟින් දත්ත එක්රැස් කිරීම සිදු කරයි. මෙය ප්‍රමාණාත්මක මෙන් ම ගුණාත්මක ගණයට ද අයත් පර්යේෂණයක් වෙයි. මෙම පර්යේෂණය මඟින් විශ්වවිද්‍යාලයීය විද්‍යාර්ථීන් සහ පර්යේෂකයන්ට අවශ්‍ය තුලනාත්මක දත්ත පහසුවෙන් ලබා ගැනීමේ හැකියාව පවතින අතර හින්දී භාෂාව ප්‍රවර්ධනයේ දී තවදුරත් අවධානය යොමු කළ යුතු අංශ පිළිබඳ ව දැනුවත් වීමට පහසුකම් සැලසේ.

මුඛ්‍ය පද : කැලණිය විශ්වවිද්‍යාලය, ප්‍රවණතාව, ප්‍රශ්නාවලි, හින්දී භාෂාව, හින්දී විෂය තෝරාගැනීම

¹ University of Kelaniya, Sri Lanka
*samindawrc@gmail.com

මිනුම් ක්‍රම තහවුරු කරගැනීමේදී ලා මඤ්ජුඡ්‍රී භාෂිතවාස්තුවිද්‍යාශාස්ත්‍රාගත ෂඩ් වර්ගයෙහි දායකත්වය

පනාවල ධම්මදස් හිමි¹

අතීතයේ පමණක් නොව නූතනයෙහි ද කලාකරුවා ස්වකීය නිර්මාණකරණයේ දී මිනුම් පිළිබඳ දැඩි අවධානයක් යොමු කරයි. ඒ සාර්ථක නිර්මාණයක් බිහි කිරීමට නම් මිනුම් ප්‍රමුඛ දායකත්වයක් උසුලන බැවිනි. අතීතයේ භාවිත මිනුම් පිළිබඳ යම් අධ්‍යයනයක් ගොඩනගා ගත හැකි වන්නේ පුරාවිද්‍යාත්මක සාධක මගිනි. එසේ නොමැති නම් ම.භා.වා.ශා. වැනි ලිඛිත මිනුම් සිද්ධාන්ත සංග්‍රහයන්ගෙනි. එහෙත් පුරාවිද්‍යාත්මක සාධක නොමැති ව ලිඛිත සිද්ධාන්තයන්ගෙන් පමණක් එකී මිනුම් කලාකරුවා භාවිත කළ බව සනාථ කර ගත නොහැකිය. කෙසේ වුවත් පුරාවිද්‍යාත්මක සාධක ඔස්සේ මිනුම් පිළිබඳ අධ්‍යයනයේ දී සනාථ වූයේ සංරක්ෂණය කිරීම්, ප්‍රතිසංස්කරණය කිරීම් හා කලා නිර්මාණ, ගොඩනැගිලි ආදියෙහි බොහෝ කොටස් විනාශ වී යාම් ආදිය නිසා ලිඛිත සිද්ධාන්තමය මිනුම් සෘජුව පුරාවිද්‍යාත්මක සාධක සමග සැසඳීමෙන් විවිධ ශංකාවන් උත්පාදනය වන බවයි. මෙම ගැටලු නිරාකරණය කරගැනීම සඳහා ම.භා.වා.ශා. කෘතියෙහි දර්ශිත ෂඩ් වර්ගය දායක කර ගත හැකි ද යන ප්‍රධාන පර්යේෂණ ගැටලුව ඔස්සේ මෙම පර්යේෂණය මෙහෙය වේ. ෂඩ් වර්ගය යනු ගණිතමය සූත්‍ර සයක් භාවිත කරමින් යොදාගනු ලබන මිනුම් ඒ ඒ ගොඩනැගිලි සඳහා පරමාර්ථමය වශයෙන් යෝග්‍ය වේ ද යන්න පරීක්ෂා කරනු ලබන ක්‍රමවේදයකි. මෙහි දී පුරාවිද්‍යාත්මක වශයෙන් අනුරාධපුර දිස්ත්‍රික්කයේ, අනුරාධපුර යුගයට අයත් ආරාම නෂ්ටාවශේෂයන්හි කේන්ද්‍රඵලය හෙවත් වර්ගඵලය කේන්ද්‍ර අධ්‍යයනයෙන් ලබාගෙන ඉහත කී ගණිතමය සූත්‍රයන් සමගින් සැසඳීම මෙහි පර්යේෂණ ක්‍රමවේදයයි. එසේ ම ප්‍රධාන මූලාශ්‍රය වශයෙන් මඤ්ජුඡ්‍රීභාෂිතවාස්තුවිද්‍යාශාස්ත්‍රය ද පුස්තකාල පරිහරණය, අන්තර්ජාල පරිහරණය මගින් දත්ත සංග්‍රහ කෙරේ. යෝනි, නක්ෂත්‍ර, අය, ව්‍යය, අංශක හා වාර යන ගෘහයක් නිර්මාණයේ දී භාවිත කළ යුතු මෙම ෂඩ් වර්ගය ලෝකෝත්තර අරමුණු සාධනය වෙනුවෙන් ආරාම ගෘහයන් නිර්මාණයට උපයෝගී කරගෙන ඇතැයි යන උපකල්පනයන් එමගින් ආසන්න වශයෙන් හෝ පුරාවිද්‍යාත්මක නෂ්ටාවශේෂයන්හි භාවිත මිනුම් නිවැරදි ව සනාථ කරගත හැකිය යන විශ්වාසයෙන් මෙම පර්යේෂණය සිදුකෙරෙන අතර මෙම පර්යේෂණය සාධනය වුවහොත් එය පුරාවිද්‍යා ක්ෂේත්‍රයට මෙන් ම නූතන ආරාමකරණයටත් අතිශය වැදගත් වේ.

මුඛ්‍ය පද : ආරාම, පුරාවිද්‍යා, මඤ්ජුඡ්‍රී, මිනුම්, වාස්තුවිද්‍යා, ෂඩ්වර්ග

¹ සංස්කෘත හා පෙරදිග ශාස්ත්‍ර අධ්‍යයනාංශය, මානවශාස්ත්‍ර පීඨය, කැලණිය විශ්වවිද්‍යාලය, ශ්‍රී ලංකාව

**විගාමික චිත සාහිත්‍යය නිර්මාණකරණයෙහිලා කැලණිය විශ්වවිද්‍යාලයෙන් ලැබෙන
දායකත්වය පිළිබඳ අධ්‍යයනයක්**

රණසිංහ ආර්. එම්. ටී. ඩී.

චිත-විබේචන භාෂා පවුලට අයත් චිත භාෂාව අද වන විට චිතයෙන් පිට වෙනත් රටවලට ද ව්‍යාප්ත වී ඇත. 'විගාමික චිත සාහිත්‍ය නිර්මාණ' යනු විදේශ ගත චිත ජාතිකයින් සහ පරම්පරාවෙන් චිත සම්භවයකට උරුමකම් කියන හෝ චිත භාෂාවෙන් ලියන විදේශ ජාතිකයින් විසින් චිත බසින් රචනා කරන ලද චිත සාහිත්‍යමය නිර්මාණයි. ශ්‍රී ලංකාවේ ද විදේශ භාෂාවක් ලෙස චිත භාෂාව භාවිත වන අතර අද වන විට විශ්වවිද්‍යාල අධ්‍යාපන පද්ධතියට ද චිත භාෂාව ඇතුළත් වී ඇත. චිත භාෂාව ඉගෙනීම සහ ඉගැන්වීම පමණක් නොව ඒ ආශ්‍රිත නිර්මාණකරණයෙහි ලා මෙම විශ්වවිද්‍යාල මහඟු දායකත්වයක් දක්වයි. ඒ අතුරෙන් කැලණිය විශ්වවිද්‍යාලය විදේශීය චිත සාහිත්‍ය නිර්මාණකරණය සඳහා ලබා දී ඇති දායකත්වය පිළිබඳ ව සොයා බැලීමත් එවන් නිර්මාණ සඳහා නාමාවලියක් සකස් කිරීමත් මෙම පර්යේෂණයේ අරමුණ යි. කැලණිය විශ්වවිද්‍යාලය තුළ චිත බසින් සාහිත්‍යකරණයේ දී වැඩි නැඹුරුතාවක් දක්වන්නේ කුමන අංශවලට ද, එමෙන් ම තව දුරත් වැඩි දියුණු විය යුත්තේ කුමන අංශ ද යන්න මෙහි දී ඇතිවන පර්යේෂණ ගැටලු වේ. මෙහි පර්යේෂණ සීමාව වශයෙන් තෝරා ගෙන ඇත්තේ කැලණිය විශ්වවිද්‍යාලයේ ආචාර්යවරුන් මෙන් ම ශාස්ත්‍රවේදී ගෞරව උපාධි අවසන් වසර විද්‍යාර්ථීන්ගේ චිත බසින් රචනා වී ඇති සාහිත්‍යමය නිර්මාණ යි. මෙහි දී සම්මුඛ සාකච්ඡා සහ ප්‍රශ්නාවලි මගින් දත්ත ලබා ගන්නා අතර මෙම පර්යේෂණය මගින් චිත භාෂාව ඉගෙන ගන්නා විද්‍යාර්ථීන්ට මෙන් ම පර්යේෂණ කාර්යයේ නියැලෙන්නන්ට නිවැරදි මූලාශ්‍ර සොයා ගැනීම පහසු කරලීමටත්, චිත බසින් සිදු වන නිර්මාණකරණය තවදුරත් ප්‍රවර්ධනය කරලීමටත් අවස්ථාව සැලසේ.

මුඛ්‍ය පද : කැලණිය විශ්වවිද්‍යාලය, නාමාවලිය, චිත භාෂාව, විදේශ චිත සාහිත්‍යය, විදේශ චිත සාහිත්‍යය නිර්මාණ

ශ්‍රී ලාංකේය රූපවාහිනී මාධ්‍යයේ ඒකාංක ටෙලිනාට්‍ය පිළිබඳ විමර්ශනාත්මක අධ්‍යයනයක් (ආනන්ද අබේනායකගේ “සංසාරේ පියසටහන්” ඒකාංක ටෙලිනාට්‍ය ඇසුරෙන්)

රණේපුර යූ. ජේ.

ශ්‍රී ලාංකේය රූපවාහිනී මාධ්‍යයේ විකාශනය වන වැඩසටහන් ආකෘති අතර ඒකාංක ටෙලිනාට්‍ය යනු (One/Single Episode Teledrama) නාට්‍යමය ලක්ෂණවලින් යුතු සංකීර්ණ කලා භාවිතයක් වශයෙන් හඳුනාගත හැකිය. ඒකාංක ටෙලිනාට්‍ය නිෂ්පාදනය හා විකාශනය ප්‍රමාණාත්මකව සංසන්දනය කිරීමේදී මාලා නාට්‍ය හෝ ප්‍රාසංගික ටෙලිනාට්‍ය ප්‍රමාණයට වඩා බෙහෙවින් ම අඩු අගයක් ගනී. එහෙත් ඒකාංක ටෙලිනාට්‍යයේ තිබෙන සංකීර්ණ කතා වින්‍යාසය නිසා බොහෝ රූපවාහිනී ප්‍රේක්ෂකයින් ඒකාංක ටෙලිනාට්‍ය නැරඹීමට වැඩි අවධානයක් යොමු කොට ඇති බව හඳුනාගත හැකිය. ඒකාංක ටෙලිනාට්‍යකරණයේ පුරෝගාමීත්වය ශ්‍රී ලංකා රූපවාහිනී සංස්ථාවට හිමි වන අතර එය කලාත්මක නිර්මාණකරණය දක්වා ව්‍යාප්ත වන්නේ ද ආනන්ද අබේනායකගේ “සංසාරේ පිය සටහන්” නම් වූ ඒකාංක ටෙලිනාට්‍යයෙන් වීම ද විශේෂත්වයකි. ශ්‍රී ලාංකේය රූපවාහිනී මාධ්‍යයේ විකාශනය කරන ඒකාංක ටෙලිනාට්‍ය ආකෘතිය, අන්තර්ගතය සහ නිර්මාණකරණය පිළිබඳ අධ්‍යයනයක් මෙතෙක් සිදුව ඇති බවක් හඳුනාගත නොහැකි හෙයින් එහි මූලික දැනුම් පරතරය ද හඳුනාගනිමින් මෙම පර්යේෂණය දියත් කෙරිණ. ඒ අනුව ක්‍රි.ව. 1993 සිට 2016 දක්වා ශ්‍රී ලංකා රූපවාහිනී සංස්ථාව මගින් විකාශනය කරන ලද ආනන්ද අබේනායකගේ “සංසාරේ පියසටහන්” ඒකාංක ටෙලිනාට්‍ය මාලාව මෙම අධ්‍යයනය සඳහා පාදක කරගත් අතර ඒකාංක ටෙලිනාට්‍යයේ ආකෘතිය හා අන්තර්ගතය කෙරෙහි බලපෑ සාධක කෙරෙහි සුවිශේෂ අවධානයක් යොමු කොට ඇත. මෙහිදී සංසාරේ පියසටහන් ටෙලිනාට්‍ය මාලාව නිර්මාණය කිරීම හා ඒවායෙන් නිරූපණය වන සධුපද්දයන් සමාජගත කිරීම සඳහා නිර්මාණාත්මක උපක්‍රම සාධනීය ලෙස භාවිත කිරීම ගැඹුරින් විමර්ශනය කෙරිණ. මේ පර්යේෂණය සඳහා සංසාරේ පියසටහන් ඒකාංක ටෙලිනාට්‍ය 237ක් මූලික වශයෙන් යොදා ගත් අතර ඉන් 07ක් තෝරාගෙන ඒවා සංසන්දනාත්මක විමර්ශනයකට ලක් කෙරිණ. මෙම අධ්‍යයනයෙන් ඒකාංක ටෙලිනාට්‍ය නිර්මාණ අන්තර්ජාතික වශයෙන් ශ්‍රී ලාංකේය අනන්‍යතාව ප්‍රදර්ශනය කිරීම උදෙසා භාවිත කළ හැකි බවත්, ඒ සඳහා පොදු මානවීය ගුණාංග නිර්මාණකරණයට පදනම් කර ගැනීමේ ශක්‍යතාවක් ඇති බවත් මෙහි දී පෙන්වා දීමට අපේක්ෂිත ය.

මුඛ්‍ය පද : ශ්‍රී ලාංකේය ඒකාංක ටෙලිනාට්‍ය, ආනන්ද අබේනායක, රූපවාහිනී මාධ්‍යය

Stress-free education during the fuel crisis in Batticaloa: Perspectives of teachers

Remoshan V.^{1*}

Education is the only key to uplift the society in order to develop our country; the crucial element of education is the teacher. Thus, the teachers should be happy and healthy mentally and physically. Also, they are the people who should be preserved for the next generation. In that respect, the stress-free education is always depended on the teachers who work with the children. Hence, this present study investigates the factors for stress-free education during the fuel crisis in Batticaloa district, based on the perspectives of the teachers. In order to carry out the objectives of the current research, qualitative approach was employed. The primary data were collected by using a semi-structure interview and a questionnaire. For the purpose of this study, 75 teachers were selected from five different educational zones in Batticaloa district, who work both in rural and urban areas. Also, the snowball sampling method was used for choosing samples. The results revealed some factors from the view of the teachers, they are: increasing the amount of difficult area allowance according to the distance between their residence and the school because the teachers are badly effected economically, providing 30 minutes grace period especially for those who are more than 10 km away from the school, giving the first priority to the teachers for getting cooking gas, providing a new allowance as fuel allowance for the teachers who work in the urban area schools or granting 50% offer for bus tickets, avoiding finger print attendance temporarily until the crisis situation will be cleared, providing a bus service only for the teachers like Sisuseriya and allocating a particular time for the teachers to get fuel. Therefore, it is the responsibility of the Sri Lankan government to provide such facilities for our teachers in order to obtain the stress-free education.

Keywords: Crisis, Education, Fuel, Stress, Teachers

¹ University of Kelaniya, Sri Lanka
*vremoshan@gmail.com

A study about leadership challenges and issues faced by Sri Lankan state university libraries in the disruption era

Sanjeewani M. D. S. M.^{1*}

At present, a number of crisis situations are being emerged in the Sri Lankan society. They have affected every aspect of the society such as political, economic, educational, administrative, etc. Libraries are also experiencing this crisis and finding possible solutions. As a result, the library sector in Sri Lanka is largely adapting to the digital environment. University libraries play a key role there. They strive to maintain library resources and services online as much as possible. It is important to identify how the library leadership face this task. The main purpose of this research is to identify the leadership challenges and issues faced by the university library leaders. Other objectives of this study are to identify the key skills and abilities that he or she should obtain as a library leader, and to explore leadership development opportunities. The Survey method has been used for this study and interviews were the data collecting method. The population of the study is library leaders of state university libraries in Sri Lanka. As the sample, 10 senior assistant librarians were randomly selected from state university libraries representing the population. The participants were interviewed through face-to-face meetings and telephone conversations. Data analysis was done by describing the data which were collected. According to the study, several major challenges and issues can be identified in rebuilding the prevailing library services and new library services on digital platforms, marketing library resources and library services on the digital platforms and handling financial scarcities. Further, they should guide to improve ICT skills and professional skills of the library staff. ICT skills, communication skills, team working skills, managerial skills of the administration, and managerial skills in human resources in changing situations must be acquired by library leaders in the university libraries. Library leaders should attend skills development programs, leadership development programs, and training programs for ICT skills and tend to acquire new technologies of ICT. In addition, they should always pay attention to keep training ICT skills and new technologies for library staff.

Keywords: Library leaders, Leadership challenges, Leadership issues, University libraries, Disruption era, Sri Lanka

¹ Library officer, Australian College of Business and Technology, Sri Lanka
*subashinimadumalika95@gmail.com

The influence of child negligence on children's mental wellbeing

Serasinghe H. P.

Children are regarded as the future of the world who need stable mental and physical health to move forward as grown-up individuals. Children need love, affection, protection, and proper education in their different age stages. According to a report published by the National Child Protection Authority (NCPA), from 2010 to 2018, more than in any other part of Sri Lanka, children who live in Western Province were reported to have received less attention in terms of basic human needs. Precisely, 'cruelty to children' and 'not giving compulsory education' have consecutively ranked first or second place among the neglect categories, which has turned out to be a controversial issue. With all these reports and information, it is regretful to state that only a handful of research studies have been conducted concerning child neglect. Since it was evident that child neglect is a continuously prevailing condition in Sri Lanka, it is rare to find studies related to the neglect and mental wellbeing of children. This study aims to identify the mental wellbeing of the victims of child neglect. Primary data were collected using the survey method contained structured questionnaires (N=134) and semi-structured interviews (N=10) from neglected children who were reported in Gampaha District. Both quantitative and qualitative analyses revealed that participants who belonged to the category of physical neglect and cognitive neglect represented lower levels of mental wellbeing. In contrast, those who belonged to the emotional neglect and supervision neglect represented moderate mental wellbeing levels. Among them, the most common neglect category was physical neglect. The mental wellbeing of the victims of physical neglect in the sample remained at a lower level. Several programs should be implemented to improve the awareness of the victim's parents and relevant government offices to reduce child neglect and develop their mental wellbeing.

Key words: Child neglect, Mental wellbeing, Physical neglect, Emotional neglect, Cognitive neglect, Supervision neglect

International trade in post-pandemic era: perspectives of growth, investment & supply chain in South Asia & Southeast Asia

Ramanayake S. S.¹ Marwah R.²

Ever since the outbreak of the coronavirus in late 2019, more than 5 million people worldwide have lost their lives, in addition to the closure of businesses. The global economy contracted by a staggering 4.3 percent in 2020. The fallout on trade, investment, supply chains, and manufacturing sectors was particularly grave, with cascading impacts on developing countries' GDP, employment, and livelihoods. This article examines the global context of the pandemic on growth rates, international trade, and investment, explicitly focusing on South Asia (Bangladesh and Sri Lanka) and Southeast Asia (Vietnam and Cambodia). These countries are the major suppliers of readymade garments (RMG) to western markets. Simultaneously, the highest percentage in export earnings represents the RMG sector; furthermore, most Foreign Direct Investment (FDI) flew into this sector. Therefore, this paper assesses the supply chain disruptions in the RMG sector, given that all four countries are critically dependent on this sector to power their growth. The issue of raw materials and the decline in demand from western markets are also examined to understand the extent to which job losses and factory closures have been experienced, though the impacts on all the countries are differentiated, particularly some countries that China has profoundly impacted in terms of trade. Therefore, this paper has highlighted these issues in detail responding to these questions. First, what are the COVID-19 impacts on trade in these countries? (Bangladesh, Sri Lanka, Vietnam, and Cambodia). Second, what are the supply chain disruptions in these four countries? Third, what are the specific impacts on the readymade garment industry? Fourth, what are the pandemic impacts on FDI? And finally, what is the way forward? As methodology, this study conducted a comparative analysis using statistical data related to the indicators in both pre-pandemic and post-pandemic eras. The main finding revealed that Bangladesh, Sri Lanka, Vietnam, and Cambodia are prepared to adapt to the dynamic changes that could disrupt production and consumption within the RMG sector, contributing substantively to export earnings and employment. Thus, each country's reactions and recovery periods are different and diverse. Therefore, several policy prescriptions are listed for SA and SEA to overcome bottlenecks of supplies of raw materials, the importance of government support, and shorter and diversified supply chains. Furthermore, this gives some thought to these two regions to enhance regional cooperation to facilitate faster recovery in the Post-Pandemic Era.

Keywords: Covid 19 Pandemic, Trade, Supply chain, Readymade garment industry, SA & SEA

¹ sulochani00@kln.ac.lk, Senior Lecturer, Department of Social Statistics, University of Kelaniya, Sri Lanka
² reenamarwah@yahoo.com, Professor, Jesus and Mary College, Delhi University, India

The Growing minilateralism and the future of the Indian Ocean Region (IOR)

Wijesinghe H.^{1*}

Given its geopolitical significance, the Indian Ocean Region has become the center of attention in international politics. In fact, it is safe to say that this region is the Chessboard where the great battle for supremacy in world politics is being played. Both regional and extra-regional players are now showing great interest in the region and the competition is unprecedented. One major development in the region is the creation of small-scale military/strategic alliances. Today, there are several such initiatives including AUKUS and the Quad. This growing presence of such minilateral initiatives indeed makes a significant impact which is worth looking at. The main objective of this research is to examine the impact of such minilateral initiatives on the IOR. The study focuses on the AUKUS and the Quad as both have gained greater significance in the present geopolitical setup and at the same time, they have already made a significant impact on the power structure in the region. This is a qualitative research based on secondary data. Looking at the theoretical design of the study, it looks at these developments from the neorealist perspective. The study remains significant for a number of reasons. First and foremost, these minilateral initiatives have come to the forefront at a time when there are a number of regional initiatives such as IORA, BIMESTEC, and SAARC are present in the region. Even ASEAN has shown keen interest in the region. Secondly, looking at the purpose, one major objective behind the establishment of both AUKUS and QUAD is to deter the growing Chinese influence in the region. It is also important to note the role of extra-regional forces in the IOR. As far as the findings are concerned, first, it is important to underscore the main reasons behind establishing such initiatives. First and foremost, it is the geopolitical and geoeconomic significance. This century is termed the Asian Century where the region of Asia is set to lead international politics in the coming years. This region is home to a number of emerging economies including India, Bangladesh, Indonesia and Myanmar, the United Arab Emirates, and Iran. Moreover, the external powers also attempt to make a significant presence in the region. The main reason behind the growing significance of the IOR has been to ensure uninterrupted trade via maritime trade routes. Taking the case of China, as a country highly dependent on international trade, it is vital for China to ensure uninterrupted trade. This growing geostrategic significance has paved the way for the creation of minilateral security setups such as AUKUS and QUAD. The research finds that these multilateral setups on one hand have a significant impact on the overall balance of power in the region while they also face some challenges of their own. On the other hand, such minilateral initiatives have a better chance of succeeding as they are smaller groupings in contrast to other regional setups. It also makes the region highly vulnerable as now countries are working collectively to attain their geostrategic interests. However, there is also a possibility that such initiatives could fail. Looking at these initiatives, it is important to understand that despite countries being willing to work together, their own national interests rest above the others. However, alliance building of this nature is to have a profound impact on the future of IOR.

Key Words: IOR, AUKUS, Quad, China, Minilateral initiatives

¹ University of Kelaniya, Sri Lanka
* virajw@kln.ac.lk

The humoral theory and human psychology in traditional medical systems of ancient Greek medicine and Ayurveda medicine

Randiwela R. M. D. S.

The humoral theory is one basic principle which identified a number of bodily liquids as the main constituents of living beings. Thereby health is the maintenance of balance between these Humors while diseases are their imbalance. Its earliest roots in the West can be detected in Greek medicine in the medical cult practices of Asclepius in Asclepeions (700 BCE) and later in Hippocrates who was an Asclepiad (460 – 377 BCE). In the East, the humoral theory can be witnessed in Ayurveda (1000 BCE) as the concept of Tridosha. Moreover, both systems highlighted that the levels of Humors not only affect the humans physically causing disease but also psychologically diseasing the mind as well. For instance, Greek medicine identifies as the Humors of blood, phlegm, yellow bile and black bile and the four temperaments of Sanguine, Choleric, Melancholic and Phlegmatic which ultimately decided the attributes of a person. Ayurveda recognizes three bodily liquids named Tridosas of vatha 'Air', pitha 'Bile' and kapha 'Phlegm' as the key to the maintenance of physical health while Trigunas or three virtues of Sattva, Rajas and Tamas maintained wellbeing of the human psychology. Moreover, both systems believed in maintaining a relative proportion of Humors in the human body to be regulating the human temperament along with behavioral manifestations. Thereby the objective of this paper is to analyze the Theories of Humors in Ancient Greek medicine and Ayurveda medicine and its effect on human psychology, the effect of human psychology on the balancing and unbalancing of Humors and identify the parallels in their identification, approach and treatments. Moreover, it will also analyze the holistic approach apparent in both Greek medicine and Ayurveda medicine where the human was considered as a psychosomatic entity. This paper will use Historic method under Qualitative research methodology as this study will have to read, analyze and interpret historical material in English and Sinhala translations as its main device for gathering and analyzing information. Thus, this will mainly involve the finding, reading, evaluating, organizing and synthesizing of both primary sources and secondary sources relevant to the topic in order to finally arrive at the purpose of the study. In conclusion, it can be observed that though there is a similarity in the identification of Humors and its effect on temperaments and mind conditions as apparent in Greek medicine and Ayurveda medicine, the approach in their classification, identification and number are different. However, it can be concluded that in traditional medical systems identified as in Greek medicine and in Ayurveda medicine, the knowledge on functioning of Humors and its relation on temperaments and Trigunas can be identified as a depiction of scientific perception of mental health in traditional medical systems. Moreover, the significance of mental wellbeing to the overall physical wellbeing and physical wellbeing to the mental wellbeing are also apparent.

Key words: Greek medicine, Ayurveda medicine, Humors, Tridosha, Temperaments, Triguna

A close examination of the ancient contacts between Greece and Egypt with special reference to Greek and Egyptian foreign relations from the 7th to 5th centuries BCE

Perera C. T. S. S.^{1*}

Greece and Egypt can be studied as two ancient civilizations that developed in Europe and Africa respectively. Even though they were in two different geographical regions facing the Mediterranean Sea, remaining historical texts and archaeological evidence attest to close connections that existed between Greece and Egypt which can be dated back to 3000 BCE. Greece and Egypt were in constant struggles with foreign threats from the 7th century onwards, but according to the above-quoted evidence, they have managed to maintain friendly cooperative relations with each other. Egypt faced the threats of the Assyrian army in the 7th century while the Greco-Persian war lasted for over half a century from 492-449 BCE. According to the accounts of the Greek Historians Herodotus and Diodorus, there were Ionian and Carian soldiers in the Egyptian army under the Egyptian King Psammaticus I. On the other hand, Egypt sent a large quantity of grain to Athens when there was a grain shortage for the Athenian population during the time of war. These crucial instances reflect how Greece and Egypt reached out to each other seeking resources and help. They can be recognized as mutually beneficial relations. The remaining evidence on Greco-Egyptian contact narrows Egyptian connections specifically to Athens. Accordingly, it is worth recognizing the nature of this commitment between Egypt and Athens. Further, the significance lies in the fact that both Greece and Egypt continued foreign relations with each other as evident in their Maritime agreement signed in 2020. Accordingly, this paper intends to examine and analyze the nature of the ancient relations that existed between Athens and Egypt from the 7th to 5th Centuries BCE. The results of this study will set an example for modern-day foreign relations. The historical method under qualitative methodology will be followed as the paper will rely on historical evidence and scholarly ideas on these ancient literary and archaeological recordings.

Key Words: Athens, Egypt, Crisis situations, Foreign relations, Mutually beneficial

¹ Department of Western Classical Culture and Christian Culture, Faculty of Humanities, University of Kelaniya, Sri Lanka

* sathsi.perera@gmail.com

A study on streaming media as a method to overcome the current economic crisis in Sri Lanka: with special reference to YouTube content creations

Podduwage D. R.^{1*}

In the Digital Age, streaming media can be recognized as a mainstream way of getting information. It brings out the audio and/or video content that internet users consume without downloading it to their hard drives. Further, this is the apex of technological advancement in sharing audio and video content on the internet. Among many streaming media platforms, "YouTube" is the largest and most popular video-sharing platform on the internet. YouTube is the key reason behind online video culture. In Sri Lanka, a few studies have been done on streaming media through the scope of information and communication. Yet, streaming media and its usage in Sri Lanka should be studied through a humanistic scope in a film and television context as they are video creations. YouTube has given an opportunity to video creators to earn through their video content. Accordingly, creating videos for YouTube by freelancers, nowadays identified as 'YouTubers', is one of the most recognized professions in the world. Thus, YouTube can be used as an effective method by the Sri Lankan YouTubers to overcome the current economic crisis faced by Sri Lanka by earning foreign currency for the country. The study mainly focused on the top 200 YouTube channels in Sri Lanka and narrowed it down to the most viewed 15 video creations from the 15 most subscribed channels. Film linguistic elements, story-telling elements, and the visual appeal which should be aligned with the creativity of these video contents will be analyzed through the content analysis method. The study is focused on how content creators used their video creation practices to succeed on the YouTube platform. Further, the study will discuss how to develop the overall quality of these video contents to increase the popularity of the YouTube channels created by the Sri Lankan YouTubers. The study revealed many findings related to streaming media within a Sri Lankan context. The study evidently proved that contents created by the top Sri Lankan YouTube channels lack the qualities of originality, and creativity and they have not considered philosophy and theoretical values, in their video productions. Consequently, suggestions have been made to expand the conventional video content creation practices in streaming media platforms.

Keywords: Streaming media, YouTube, Video content creation, Usage and practice in Sri Lanka, Economic solution

¹ University of Kelaniya, Sri Lanka
* drandula@gmail.com

Defining quality assurance in academic library perspective: a systematic review

Fernando I. D. K. L., Warnasooriya W. W. S. T.

Quality assurance (QA) in higher education has an immense impact on the quality and standardization of higher education in the world. In fact, the QA has become a major driving force behind the transformation of conventional teaching and learning practices towards modern educational systems. Libraries are integral counter part of education that support the core values of an academic institution. The term quality has been defined by different contexts, in different perspectives. However, to well adopt and smooth operationalization of QA in academic libraries, it needs to be defined accordingly. The study is based on definitions presented in previous literature related to academic library quality assurance. A systematic literature review was conducted to investigate existing definitions for QA in academic library perspective. Literature was searched in textbooks, publications in Ministry of Higher Education, official websites, academic journal databases, and newspapers with the phrases; “quality assurance”, “quality assurance in higher education”, “quality assurance in libraries”, “academic library quality assurance”, “library quality”, and “academic library transformation”. Results were then verified using the CRAAP evaluation criteria and 30 directly related literature were selected for further investigation. It was evident that, the definition of QA in academic libraries should include the concept that the quality of a library is “the difference between what users expect from the academic library and what library actually gives”. This concept can be used to formulate a proper definition for academic library industry or for a sperate library itself. However, the definition of academic library must be evident in their vision, mission, core values, objectives, services, and lead to formulate policies, procedures, standards, and accreditation related to library practices and education. It also opens the gateway towards academic library transformation, to meet the ever-changing needs of the society. Outcome of the research will be beneficial for any (academic) library that seeks to meet the needs of its users and utilize its resources to achieve a best return on investment to the community.

Keywords: Quality assurance, Academic library, Academic library transformation

**බ්‍රිතාන්‍ය පාලන අවධියේ ස්වදේශික ජනතාවගේ සෞඛ්‍ය සේවා සහ රෝග නිවාරණය
(ක්‍රි.ව.1796 සිට 1815 දක්වා)**

දිල්හානි ඒ.

ක්‍රි.ව. 1796 දී මෙරට මුහුදුබඩ පළාත්වල පාලන බලය අල්ලාගත් බ්‍රිතාන්‍යයන්ට මුහුණ දීමට සිදු වූ ප්‍රධාන අභියෝගයක් වූයේ දිවයින තුළ ව්‍යාප්තව පැවැති ලෙඩ රෝග හා වසංගතයයි. බ්‍රිතාන්‍යයන්ට මෙරට තුළදී ආගන්තුක වූ රෝග බොහොමයක් ස්වදේශික ජනතාව අතර ව්‍යාප්තව තිබුණි. එම රෝග අතර උණ, පාවනය, අනිසාරය, ලාදුරු, ආමාශය සම්බන්ධ වැනි රෝග ප්‍රධාන තැනක් ගත් අතර බ්‍රිතාන්‍යයන් මුහුදුබඩ පළාත්වල බලය ලබාගත් මුල් අවධියේ සිටම වසූරිය, වසංගතයක් ලෙස ව්‍යාප්තව තිබුණි. මෙම වසූරිය වසංගතය බ්‍රිතාන්‍යයන්ට ප්‍රධාන අභියෝගයක් වූවත් ස්වදේශික ජනතාව අතර කලක සිට ව්‍යාප්තව පැවැති රෝගයකි. කෙසේනමුදු ස්වදේශිකයන් දේශීය වෛද්‍ය ක්‍රමයකට හුරු පුරුදුව සිටි පිරිසක් වූ නිසා තමන්ට වැළඳුණ රෝගවලට ප්‍රතිකාර අවට පරිසරය තුළින් මෙන් ම බලි තොවිල් වැනි විශ්වාස හා මිථ්‍යා මත අනුගමනය කරමින් සුව කර ගැනීමට පෙළඹුණහ. වසූරිය රෝගය දේශීය ජනතාව මගින් තම යුධ හමුදාවට විශාල බලපෑමක් එල්ල වනු දුටු බ්‍රිතාන්‍යයන් වසූරිය බෝවීම වැළැක්වීම සඳහා එන්නත් කිරීම ආරම්භ කළේය. ඒ අනුව වසූරිය වැළඳුණ ජනතාව එන්නත් කිරීමේ ක්‍රියාවලිය 1802 දී මුහුදුබඩ පළාත්වලට හඳුන්වා දෙන ලද අතර උඩරට ජනතාව සඳහා වසූරිය රෝගය වැළැක්වීම සඳහා එන්නත් කිරීම ආරම්භ වූයේ 1816 දී ය. එමෙන්ම බ්‍රිතාන්‍යයන් පවිත්‍රතාවයට මුල් තැන දෙමින් කොළඹ නගරය විධිමත් සැලැස්මකින් යුතුව පවත්වාගෙන යාමට කටයුතු කරන ලදී. එහිදී ස්වදේශික ජනතාව අතර රෝග ව්‍යාප්තිය අවම කිරීමේ අරමුණින් කොළඹ කොටුව සහ කොළඹ නගරය තුළ පිරිසිදුකම පවත්වාගෙන යාම සඳහා ව්‍යවස්ථාවක් පැනවූ අතර එම ව්‍යවස්ථාවට අනුව ප්‍රසිද්ධ වීදිවල කුණු කැලී කසළ දමන ඕණැම පුද්ගලයෙකුට රික්ස් ඩොලර් දෙකක් දඩ ගැසිය යුතු බවත් නැතහොත් දින 14 සිර දඬුවමකට යටත් කිරීමට නියෝග කරන ලදී. මේ අනුව බ්‍රිතාන්‍යයන් තම පාලන කාලයේ මුල් අවධිය තුළ මෙරට ස්වදේශික ජනතාවගේ සෞඛ්‍යාරක්‍ෂණය සම්බන්ධ රෝග නිවාරණ කටයුතුවලදී අනුගමනය කළ විධික්‍රම පිළිබඳව විමර්ශනය කිරීම මෙම අධ්‍යයනයේ අරමුණ වේ. මෙහිදී බ්‍රිතාන්‍යයන් විධිමත් නාගරික සැලැස්මක් හා සනීපාරක්‍ෂක රෙගුලාසි පැනවීම ආදිය අනුගමනය කරන්නට ඇත්තේ තම යුරෝපීය ජාතිකයන්ගේ සහ යුධ හමුදාවේ සෞඛ්‍යය යහපත් මට්ටමින් පවත්වාගෙන යාම සඳහා බවත් එමෙන් ම ස්වදේශික ජනතාව අතර සුලභ වශයෙන් පැවතුණ ලෙඩ රෝග හා වසංගත සඳහා නිසි සෞඛ්‍යාරක්‍ෂණ ක්‍රමවේදයක් හඳුන්වා දුන්නේ බ්‍රිතාන්‍යයන් විසින් බවත් පැහැදිලිය. මෙහිදී ප්‍රාථමික මූලාශ්‍රය වශයෙන් විවිධ බ්‍රිතාන්‍ය නිලධාරීන් හා ඉංග්‍රීසි ජාතිකයන් ලංකාව පිළිබඳව ස්වකීය අත්දැකීම් අලලා රචනා කරන ලද ග්‍රන්ථ, බ්‍රිතාන්‍ය නිල වාර්තා, පරිපාලන වාර්තා, සැසි වාර්තා සහ ද්විතියික මූලාශ්‍රය මගින් කරුණු එක්රැස් කිරීම තුළින් මෙම අධ්‍යයනය සිදු කරනු ලැබේ.

මූලාස පද : බ්‍රිතාන්‍යයන්, ස්වදේශික, වසංගත, ලෙඩ රෝග, වසූරිය

පාස්කු ඉරුදින ප්‍රහාරයෙන් පසු ලාංකේය කිතුනු-ඉස්ලාම් අන්තර් ආගමික සංවාදය (මීගමු පුරවැසි එකමුතුව පිළිබඳ සිද්ධි අධ්‍යයනයක් ඇසුරින්)

පෙරේරා ඒ.

ජුදා දහමින් පෝෂණය ලැබූ කිතුනු-ඉස්ලාම් ආගම් අතර සමානතා මෙන්ම අසමානතා පවතී. මෙම ආගම් දෙකෙහි ඉතිහාසය දෙස බලන විට ආගමික අන්තවාදි ප්‍රවණතා දක්නට ලැබේ. කිතුනු-ඉස්ලාම් ගැටුම් හුදෙක් ආගමික සංකල්පයන් මත පමණක් පදනම් නොවුවකි. මෙම ගැටුම් ප්‍රථමයෙන් ආරම්භ වූයේ සුළු ආසියාතික ප්‍රදේශයන්යන්හි ඉස්ලාම් බැතිමතුන් ක්‍රිස්තියානි ප්‍රදේශ ආක්‍රමණය කිරීමත් සමගය. එයින් සියවස් හතරකට දීර්ඝ කාලයක් පැවති කුරුස යුධ මාලාව ඇති විය. මෙම ආගමික අන්තවාදි ගැටුම් ක්‍රමයෙන් දේශපාලන හා ආර්ථික ක්ෂේත්‍ර කරා ද ව්‍යප්ත විය. ලංකාව තුළ කිතුනු-ඉස්ලාම් විරසකය ප්‍රථමයෙන් ආර්ථිකය මත පදනම් වූවද, පාස්කු ඉරුදින ප්‍රහාරයත් සමග එය ආගමික අන්තවාදි ස්වරූපයක් ගත්තේය. ඉස්ලාම් අන්තවාදි පිරිසක් විසින් 2019 අප්‍රියෙල් 21 වන පාස්කු ඉරුදින කොළඹ, මීගමුව හා මඩකලපුව යන ප්‍රදේශ ඉලක්ක කර සිදු කළ ප්‍රහාරය දේශීය මෙන්ම ජාත්‍යන්තරවද කිතුනු-ඉස්ලාම් සංහිදියාව බිඳ වැටීමට හේතුවන්නක් විය. විශේෂයෙන්ම පුංචි රෝමය ලෙස නම් කරන කිතුනුවන් බහුතරයක් ජීවත් වන, ඒ හා සමානවම ඉස්ලාම් බැතිමතුන් වෙසෙන මීගමුව ප්‍රදේශය මෙම ප්‍රහාරයෙන් ලක්වූ දැඩි පීඩිතභාවය මත එම ප්‍රදේශයෙන් ආරම්භ වන සාමය කඩවීමක් සමස්ත ලංකාවටම බලපාන්නට හැකියාවක් තිබේ. ඒ අනුව කිතුනු-ඉස්ලාම්වරු බහුතරයක් වෙසෙන මීගමු ප්‍රදේශයේ පාස්කු ඉරුදින අන්තවාදි සිදුවීමෙන් පසු කිතුනු-ඉස්ලාම් සංහිදියාව පවත්වා ගත්තේ කෙසේද යන්න මෙම පර්යේෂණයේ ගැටලුව වෙයි. පර්යේෂණ ගැටලුව විසඳීමේදී මීගමු පුරවැසි එකමුතුව කෙටි කාලීන හා දීර්ඝ කාලීන වැඩසටහන් ක්‍රියාත්මක කරමින් කලාව, අධ්‍යාපනය, උපදේශනය හා දයා සේවාවන් මගින් බිම් මට්ටමේ පිරිස් වින්තනමය මග පෙන්වීමක් ඔස්සේ ලාංකේය කිතුනු-ඉස්ලාම් සංහිදියාවට දායක කර ගැනීමට කටයුතු කර ඇති බව පැහැදිලි වෙයි. මෙම ආගමික කණ්ඩායම් දෙක අතර සංහිදියාව පවත්වාගෙන යාමට නිල කිතුනු සභාව දශක කීපයකට පෙර සිටම විශේෂ අවධානයක් යොමු කර ඇත. සභා සම්මේලන පවත්වමින් හා සභා ලේඛන නිකුත් කරමින් සභාවේ ස්ථාවරය ඉදිරිපත් කර ඇති අවස්ථාවක බිම් මට්ටමේදී එය යථාර්ථයක් කිරීමට මීගමු පුරවැසි එකමුතුව ප්‍රයත්න දරා ඇති බව පෙනී යයි. මෙම පර්යේෂණයට අදාළ දත්ත රැස් කිරීමේදී ලේඛන විමර්ශනය, ක්ෂේත්‍ර ගවේෂණය හා දත්ත විශ්ලේෂණය දැක්විය හැකිය.

මුඛ්‍ය පද : කිතුනු-ඉස්ලාම්, පුරවැසි එකමුතුව, අන්තවාදි, පාස්කු ඉරුදින ප්‍රහාරය

මහනුවර යුගයේ රෝපිත ඓතිහාසික බෝධි වෘක්ෂ

ගුණසිංහ එච්.

බෝ හෙවත් ඇසතු බෝද්ධියන්ගේ වන්දනාවට පාත්‍රවන, බුදුන් වහන්සේ සංකේතවත් කෙරෙන පූජනීය වෘක්ෂයකි. අනුරාධපුර යුගයේ දෙවනපෑතිස් රජ දවස සංඝමිත්තා මහරහත් මෙහෙණිය විසින් ජය ශ්‍රී මහාබෝධියේ දක්ෂිණ ශාඛාව ලක්දිවට වැඩම කරවීමත් සමග මෙරට බෝධි වන්දනාව ස්ථාපිත විය. එතැන් පටන් ශ්‍රී මහාබෝධි ශාඛා සහ වෙනත් බෝධි ශාඛා ලංකාවේ නොයෙක් ස්ථානවල, විවිධ හේතු මුල්කොටගෙන රජදරුවන් විසින් රෝපණය කරන ලද බවට තොරතුරු හමු වේ. ශ්‍රී මහා බෝධි ශාඛා හෝ වෙනත් බෝධි ශාඛා රාජානුග්‍රහයෙන් ලක්දිව පුරා රෝපණය කිරීමේ පදනම පිළිබඳ සොයා බැලීම මෙම අධ්‍යයනයේ අරමුණයි. ඒ යටතේ මහනුවර යුගයේදී ශ්‍රී මහාබෝධි ශාඛා හෝ වෙනත් බෝධි ශාඛා විශේෂිත හේතු අරබයා කන්ද උඩරට රෝපණය කරන ලද්දේ ද යන්න මෙහි අධ්‍යයන ගැටලුවයි. එහිදී අධ්‍යයන ක්‍රමවේද වශයෙන් සාහිත්‍ය මූලාශ්‍රය අධ්‍යයනය සහ ක්ෂේත්‍ර අධ්‍යයනය යොදාගන්නා ලදී. මහනුවර යුගයේදී කීර්ති ශ්‍රී රාජසිංහ රජතුමාගේ අනුග්‍රහයෙන් කන්ද උඩරට ශ්‍රී මහා බෝධි ශාඛා රෝපණය කිරීමේ අවස්ථාවක් පිළිබඳ තොරතුරු වාර්තා වේ. අනුරාධපුර වන්දනාවේ පිටත් වූ රජතුමා ශ්‍රී මහාබෝධියෙන් ලබාගත් බෝධි ශාඛා හයක් සුදුහුම්පොළ, නිත්තවෙල, ගංගාරාමය සහ දළුකොළල යන රජමහ විහාරවල රෝපණය කරවා තබන්නාව වෙනුවෙන් ගම්වර පූජා කරනු ලැබ තිබේ. මල්වතු අස්ගිරි උභය මහාවිහාර සම සමව නියෝජනය වන පරිදි මෙම විහාර තෝරාගැනීම සුවිශේෂී ය. ඉතිරි බෝධි ශාඛා දෙක රෝපණය කර ඇත්තේ වැලිවිට සරණකර සඟරජ මාහිමියන්ගේ මැණියන් විසූ වැලිවිටවත්ත වලව්ව සමීපයේ උස් භූමියක ය. වර්තමානය දක්වා මෙම බෝධි ශාඛා සියල්ලම නිරූපිතව පවතී. මීට අමතරව වර්ෂ 1638දී ගන්නෝරුව සටනේ ජයග්‍රහණය සිහිපත් කරමින් දෙවන රාජසිංහ, කුමාරසිංහ සහ විජයපාල යන සොයුරු රජවරුන් තිදෙනා කඳවුරුලා සිටි ස්ථානවල බෝධි ශාඛා තුනක් රෝපණය කර තිබේ. රාජසිංහ බෝධිය, කුමාරසිංහ බෝධිය සහ විජයපාල බෝධිය නමින් ප්‍රකට වූ මෙම බෝධි වෘක්ෂ අතරින් දැනට ඉතිරිව පවතින්නේ ගැටඹේ දියකපනානොට ශ්‍රී රක්ඛංග විහාර පරිශ්‍රයේ පිහිටි රාජසිංහ බෝධිය සහ ගැටඹේ රාජෝපවනාරාම පරිශ්‍රයේ පිහිටි කුමාරසිංහ බෝධිය පමණකි. පේරාදෙණිය උද්භිද උද්‍යාන පරිශ්‍රයේ පිහිටි බව කියැවෙන විජයපාල බෝධිය මේ වන විට දක්නට නොලැබේ. අනුරාධපුර යුගයේ පටන් විවිධ අරමුණු මුල්කොටගෙන ශ්‍රී මහාබෝධි ශාඛා විවිධ ස්ථානවල රෝපණය කර තිබෙන බව හඳුනාගත හැකිය. මහනුවර යුගයේදී එය සිදුවන්නට ඇත්තේ අනුරාධපුර ශුද්ධ නගරය සහ කන්ද උඩරට රාජධානිය සමග ශාසනික සබඳතාවක් ගොඩනැගීමේ අරමුණින් බව පෙනේ. මීට අමතරව යුද ජයග්‍රහණ ආගමික මුහුණවරක් ඔස්සේ සැමරීමේ අපේක්ෂාව ඇතිව ද බෝධි රෝපණ සිදු කරන්නට ඇති බව පිළිගත හැකිය.

මුඛ්‍ය පද : ශ්‍රී මහා බෝධි ශාඛා, කීර්ති ශ්‍රී රාජසිංහ, දෙවන රාජසිංහ, උඩරට රාජධානිය

ලාංකේය දේශපාලන බල ව්‍යුහය ආකෘතිය හා අලි-මිනිස් ගැටුමේ උභතෝකෝටිකය ගැටුම්වැදි න්‍යායික ප්‍රවේශයක් තුළින් ඥානවීමංසනය කිරීම

කීර්ති ජේ. කේ. පී. යු.¹, අමරසිංහ එස්., කුමාර එන්. ඩී. ජී. ඒ. එ. එච්.

නූතන මහා පරිමාණ සංවර්ධන ව්‍යාපෘති ග්‍රාමීය යටිතල පහසුකම් සංවර්ධනය කිරීම සඳහා ප්‍රවේශ වීමත් එම ප්‍රවේශගතකරණයේදී ස්වභාවික පරිසරයේ තුලනාත්මක සාදකයන් පිළිබඳ අවධානය යොමු නොකිරීමත් නිසා අලි-මිනිස් ගැටුම ප්‍රකට දික්ගැස්සුණු සමාජ ගැටුමක් ලෙස සමාජය තුළ ස්ථාපිත විය. දේශපාලන බල ව්‍යුහය සම්බන්ධතාවය අලි-මිනිස් ගැටුම වර්ධනය වීම සඳහා බලපා ඇති ආකාරය කෙසේද යන්න අධ්‍යයන ගැටලුව ලෙස භාවිත කරන ලදී. අධ්‍යයනය සඳහා සමීක්ෂණ ක්‍රමවේදය යටතේ මිශ්‍ර ක්‍රමය උපයෝගී කර ගන්නා ලදී. ප්‍රමාණාත්මක දත්ත ඒකරාශී කරගැනීම සඳහා ප්‍රශ්නමාලා උපලේඛනය භාවිතා කළ අතර ගුණාත්මක දත්ත ඒකරාශී කරගැනීම සඳහා නාභිය කණ්ඩායම් සාකච්ඡා, ප්‍රත්‍යායික අධ්‍යයන භාවිත කරන ලදී. අධ්‍යයනය සඳහා සසම්භාවී නියැදිය යටතේ ස්කෘත නියැදිය භාවිතා කළ අතර නියැදියට අදාළව ප්‍රතිචාරකයන් 20ක් තෝරා ගන්නා ලදී. අධ්‍යයන ක්ෂේත්‍රය ලෙස මොණරාගල දිස්ත්‍රික්කයේ තණමල්විල ප්‍රාදේශීය ලේකම් කොට්ඨාසයට අයත් හම්බෙගමුව හා හම්බෙගමුව ජනපදය ග්‍රාම නිලධාරී කොට්ඨාස දෙක උපයෝගී කරගන්නා ලදී. මේ සඳහා සමාජ, ආර්ථික හා සංස්කෘතික වශයෙන් එකිනෙකට වෙනස් කේන්ද්‍රීය හා පරිධිය ගම්මාන දෙකක් අධ්‍යයනය සඳහා යොදා ගෙන ඇත. කේන්ද්‍රීය ගම්මානය ලෙස හම්බෙගමුවත් පරිධිය ගම්මානය හම්බෙගමුව ජනපදයත් භාවිත විය. හම්බෙගමුව ජනපදය තුළ සංක්‍රමණය වූ ජනගහනය වාසය කරන අතර ඔවුන් නැවත පදිංචි කිරීම යන සංකල්පය තුළ පරිධිය ගම්මානය ලෙස පර්යේෂකයා විසින් භාවිත කරන ලදී. ප්‍රාදේශීය හා ග්‍රාමීය දේශපාලන බල ව්‍යුහය ආකෘතිය ජාතික දේශපාලන බල ව්‍යුහය ආකෘතිය මගින් පරිශීෂ්ටනය කිරීමත් එම පරිශීෂ්ටනය ගැටුමේ පරිධිය හා කේන්ද්‍රීය සාදක සමග අනුයාත කිරීම බල දේශපාලන ගැටුමක සිට දික්ගැස්සුණු සමාජ ගැටුමක් දක්වා වර්ධනය වීමට හේතු සාදක සපයා ඇති බව අනාවරණය කළ හැකිය. වනජීවී ප්‍රතිපත්ති, අභය භූමි ප්‍රතිපත්ති දේශපාලන ක්‍රමය සමග වෙනසියාවට ලක්වීමත් අන්තර් ආංශික ආයතන අතර අන්තර් සම්බන්ධතාවය බිඳවැටීමත් ඒ සඳහා මෙහෙයුම් හා නියාමන යාන්ත්‍රණයක් අඛණ්ඩව ක්‍රියාත්මක නොවීම නිසා ගැටුම දික්ගැස්සුණු සමාජ ගැටුමක් බවට පත් වීමට හේතු සාධක වී තිබේ. ක්‍ෂුද්‍ර හා සාර්ව දේශපාලන බල ව්‍යුහය ක්‍රියාවලිය ක්‍රියාත්මක වන ආකාරය මත ගැටුම සමාජය තුළ දික්ගැස්සුණු සමාජ ගැටුමක ලක්ෂණ නිර්මාණය කර ඇත. විශේෂයෙන්ම අනුනව බදු ප්‍රතිපත්තිය මත ඉඩම් බදු දීම, දේශපාලන හිතෙහිභාවය මත රක්ෂිත මානව වාසභූමි බවට පත්වීම තුළ දේශපාලන බල ව්‍යුහය ආකෘතිය ග්‍රාමීය තලයෙහි ක්‍රියාත්මක වන ආකාරය හඳුනා ගත හැකිවිය. බල ව්‍යුහය ආකෘතිය සමග මහා පරිමාණ ව්‍යවසායකයන් හා පෞද්ගලික ව්‍යාපාරිකයන් ඉඩම් මිලදී ගැනීම, ගැසට් මගින් වනරක්ෂිත ව්‍යාපාරික කෘෂිකර්මාන්තය සඳහා ලබාදීම මගින් ක්‍ෂුද්‍ර සහ සාර්ව දේශපාලන බල ව්‍යුහය මානව හා සත්ව ප්‍රජාවගේ අවශ්‍යතා අතර සට්ටණීය සම්බන්ධතාවයක් නිර්මාණය කිරීමට පසුබිම් සාධක සපයා ඇති බව අනාවරණය කළ හැකි වේ. විශේෂයෙන්ම ගැටුමේ සාර්ව හා මධ්‍ය කාරණා පිළිබඳව සලකා බැලීමේ දී ආරක්ෂණ යාන්ත්‍රණය බිඳවැටීම, ගෘහස්ත හිංසනය, අඩු වයස් විවාහයන් ගැටුමේ දෘෂ් කෘත්‍ය සාධක ලෙස හඳුනා ගත හැකිවිය. ගෘහස්ත හිංසනය 58% ක් හා කුටුම්භය තුළ ආරක්ෂණ යාන්ත්‍රණය බිඳවැටීම නිසා මානසික හුදකලාභාවය හා ඉවිඡාභංගත්වයට පත් වූ ප්‍රතිචාරකයන් 69% අධ්‍යයන දත්ත මගින් අනාවරණය කර ගත හැකිවිය. ගැටුමෙහි තත්වාකාර සාදකයන් පිළිබඳ අවධානය යොමු කිරීමේ දී දික්ගැස්සුණු සමාජ ගැටුමක ලක්ෂණ හඳුනා ගත හැකි අතර සෘතුමය කාලයන් සමග ගැටුමෙහි උත්පාත අවපාත තත්ත්වයන් හඳුනා ගත හැකිවේ. දේශපාලන බල ව්‍යුහය ආකෘතිය ග්‍රාමීය සමාජය තුළ බලමුළුගැන්වීමත් එම බලමුළුගැන්වීම මානව කුටුම්භය තුළ සුබසාධන ක්‍රියාවලිය බිඳවැටීමටත් පරිපෝෂිත කණ්ඩායමක් ග්‍රාමීය පරිසරය තුළ නිර්මාණය වීමට අවශ්‍ය අවකාශීය පසුබිම ගොඩනැගී තිබීමත් නිසා ගැටුම දික්ගැස්සුණු සමාජ ගැටුමක් බවට විපරිවර්තනය වී ඇති බව නිගමනය කළ හැකිය. මේනිසා ගැටුම වැලැක්වීමට වඩා සමථන කාර්යක් තුළින් විසඳුම් ක්‍රියාවලියකට යොමු කිරීමට අවශ්‍ය ක්‍රියාමාර්ග සකස් කළ යුතු වේ.

මූලාස පද : අලි-මිනිස් ගැටුම, දේශපාලනික බල ව්‍යුහය, දික්ගැස්සුණු සමාජ ගැටුම, මහා පරිමාණ සංවර්ධන ව්‍යාපෘතිකරණය, සහජාතීයකරණය

¹ දර්ශන විශාරද උපාධි අපේක්ෂක, සමාජ විද්‍යා අධ්‍යයනාංශය, රුහුණ විශ්වවිද්‍යාලය, මාතර, ශ්‍රී ලංකාව

ශ්‍රී ලංකාවේ වත්මන් ආර්ථික අර්බුදය තුළ වැඩිහිටියන් මුහුණ දෙන සමාජ-ආර්ථික ගැටලු හා අභියෝග

හෙට්ටිපාර්වි පී. සී.^{1*}, අමරකුංග කේ. එම්. ජී.

වයස්ගතවීම සාධක රැසක බලපෑමට නතු වූ බහුමානීය සමාජ සංසිද්ධියක් වශයෙන් හඳුනාගත හැකියග සංවර්ධන රටවල වයස අවු:65 සහ ඊට වැඩි අයන්ල සංවර්ධනය වෙමින් පවත්නා රටවල වයස අවු:60 සහ ඊට වැඩි පිරිසත් වයස්ගත ජනගහනය වශයෙන් සැලකෙන ආසියානු කලාපයේ වේගවත් වියපත්වීමක් සහිත ජන සංඛ්‍යාවක් ඇති සමාජයක් වශයෙන් ශ්‍රී ලංකාවේල වයස අවුරුදු 60ට වැඩි මුළු ජනගහනය 2030 වන විට 22 ක් වන බවට ප්‍රක්ෂේපනය කර ඇත. ලාංකේය සමාජයේ වයස්ගත ජනගහනයේ වර්ධනයට සාපේක්‍ෂවල සමාජ-ආර්ථික වර්ධනයක් සිදු නොවීමල වැඩිහිටියන් බහුතරයකගේ ජීවිකාව තුළ විවිධ ගැටලු නිර්මාණයට හේතුවක් වී තිබෙන වත්මන් ආර්ථික අර්බුදය (Current Economic Crisis), මේ තත්ත්වය වඩාත් තීව්‍ර වීමට හේතුවක් වී තිබෙන අතරල වැඩිහිටියන් බහුතරයක් සමාජ-ආර්ථික (Socio-Economis) වශයෙන් විවිධ අභියෝගයන්ට මුහුණදෙමින් සිය ජීවිකාව ගතකරනු ලබන තත්ත්වයකි. මෙහි පර්යේෂණ ගැටලුව වත්මන් ආර්ථික අර්බුදය හමුවේ වැඩිහිටියන්ට මුහුණ දීමට සිදු වී ඇති සමාජ-ආර්ථික ගැටලු හා අභියෝග ගවේෂණය කර ගැනීමයි. පර්යේෂණ අරමුණ වනුයේ වැඩිහිටි ජීවිකාව කෙරෙහි බලපෑමක් වී ඇති සමාජ-ආර්ථික ගැටලු හා අභියෝග ගවේෂණය කර ගනිමින්ල තිරසර වැඩිහිටි දිවියක් නිර්මාණය කරගැනීමට අවැසි නව ප්‍රවේශයන් හා ක්‍රමෝපායන් හඳුනාගැනීමයි. මෙහි පර්යේෂණ ක්‍රමවේදය මිශ්‍ර ක්‍රම පර්යේෂණ ක්‍රමවේදය වූ අතරල සමීක්‍ෂණ ක්‍රමය භාවිතා වියග නියදිය වශයෙන් වැඩිහිටියන් 25කු සසම්භාවී (ස්තර නියදි තේරීම) යටතේ කණුරුපිටිය ප්‍රාදේශීය ලේකම් කොට්ඨාශය තුළින් තෝරා ගන්නා ලදී. දත්ත රැස්කිරීමේ දී ප්‍රමාණාත්මක දත්ත රැස්කිරීම සඳහා ප්‍රශ්නාවලිය (Questionnaire), සම්මුඛ සාකච්ඡාව (Interview), යොදාගනු ලැබූ අතරල ගුණාත්මක දත්ත රැස්කිරීමේ ශිල්ප ක්‍රම වශයෙන් නාභිගත කණ්ඩායම් සම්මුඛ සාකච්ඡාව (Focus Group Discussion), හා ප්‍රත්‍යයක අධ්‍යයන (Case study), නිරීක්‍ෂණය (Observation) උපයෝගී කරගන්නා ලදීග පර්යේෂණ ගැටලුව සම්බන්ධයෙන් ලිය වී ඇති ද්විතීක මූලාශ්‍ර (Secondary Sources) ආශ්‍රයෙන් ද්විතීක දත්ත රැස්කරණු ලැබියග දත්ත ප්‍රමාණාත්මක හා ගුණාත්මකව විශ්ලේශණය සිදුකරන ලදී. පර්යේෂණ අනාවරණයන්ට අනුව පැහැදිලි වන්නේ වත්මන් ආර්ථික අර්බුදයල වැඩිහිටියන් බහුතරයකගේ ජීවිකාව තුළ සුවිශේෂී සමාජ-ආර්ථික ගැටලු නිර්මාණය වීමට හේතුවක් වී ඇති බවයි. වත්මන් ආර්ථික අර්බුදය විසින් නිර්මාණය කර ඇති මානව ජන ජීවිතයේ සංකීර්ණත්වයල වැඩිහිටියන්ගේ රැකවරණය විෂයෙහි සෘජු බලපෑමක් වී තිබෙන අතරල පවුල තුළ වැඩිහිටියන් තවදුරටත් හුදෙකලා කිරීමට හේතු වී තිබෙන පවුල් සංස්ථාවේ සමාජකයින්ගේ ජීවිත සංකීර්ණවීම තුළල රැකවරණය අවැසි වැඩිහිටියන් කෙරෙහි දරුවන්ගේ සංවේදීතාවය අඩුවීමටත්ල විශේෂයෙන් වයස අවු:80ට වැඩි මහලුතම වැඩිහිටියන්ගේ ජීවන සුරක්‍ෂිතතාවය හා රැකවරණය, පෝෂණය විෂයෙහි අභියෝග මතුකිරීමටත් හේතුවක් වී තිබෙනු හඳුනාගත හැකි විණග ආර්ථික දුෂ්කරතාවයන් හේතුවෙන් පවුල් සංස්ථාව තුළ දරුවන් හා දෙමාපියන් අතර ඇති වී ඇති ගැටලු හේතුවෙන් පවුලේ සහයක පද්ධතිය විෂයෙහි ද (Family support System) බලපෑමක් වී තිබුණිග නියදිය තුළ වැඩිහිටියන් අතුරින් (68%) අවධිමත් ක්‍ෂේත්‍රයේ රැකියාවන්හි නියුතු අයවලුන් වශයෙන් පවත්නා තත්ත්වය තුළ සිය ජීවන මාර්ගයන් වෙත ප්‍රවේශවීමට නොහැකිවීමල දැඩි ආර්ථික දුෂ්කරතාවයන් ඇතිවීමට හේතුවක් වී තිබූ අතරල එහි සෘජු හා වක්‍ර ප්‍රතිඵලය වී තිබුණේ කුටුම්භයේ පෝෂණය තත්ත්වයල කෘත්‍යයන් හා සමාජ අවස්ථා පවත්වාගෙන යෑමටත් වැඩිහිටියන්ට බලපෑමක් වී තිබීමයිග නියදිය තුළ වැඩිහිටියන් අතුරින් (76%) නිදන්ගත අබාධයන් සඳහා ප්‍රතිකාර ගන්නා අය වශයෙන්ල ආර්ථික අර්බුදය තුළ සෞඛ්‍යමය වශයෙන් ද අභියෝගයන්ට මුහුණ දී ඇතග පර්යේෂණ අනාවරණයන්ට අනුව තවදුරටත් පෙනීගියේ ගෘහ කුටුම්භය තුළ ජීවත්වන වැඩිහිටි පුරුෂයන්ට සාපේක්‍ෂව වැන්දඹු වැඩිහිටි ස්ත්‍රීන් වැඩි වශයෙන් පවත්නා තත්ත්වය හමුවේ සමාජ-ආර්ථික දුෂ්කරතාවයන්ට මුහුණ දී සිටින බවයිග නිවාස තුළ පවත්නා මූලික අවශ්‍යතාවයන්ල භෞතික හා සනීපාරක්‍ෂක පහසුකම් හිඟතාවයල වැඩිහිටි ස්ත්‍රීන්ගේ ජීවන ගැටලු තවත් තීව්‍ර කිරීමටත් හා ඔවුන්ගේ යැපුම් මානසිකත්වය වර්ධනය වීමටත් හේතුවක් වී තිබෙනු හඳුනාගත හැකිවිණ.

මුඛ්‍ය පද : වැඩිහිටියා, ආර්ථික අර්බුදය, පවුල, ජීවිකාව, රැකවරණය

¹ NISD, Sri Lanka
* hettipriya250@gmail.com

2022 ගෝලීය අරගලයේ ප්‍රවෘත්ති වාර්තාකරණය - රූපවාහිනී මාධ්‍යය ඇසුරෙන්
විශ්ලේෂණාත්මක අධ්‍යයනයක්

මාධව ජේ. ඒ. ටී.¹

මෙම පර්යේෂණයේ අරමුණ වනුයේ 2022 වර්ෂයේ ගෝලීය අරගලයේ ප්‍රවෘත්ති රජයේ සහ පෞද්ගලික මාධ්‍ය අංශ විසින් වාර්තා කළ ආකාරය අධ්‍යයනය කිරීමයි. මෙහි දී කාල රාමුව ලෙස 2022 මැයි මස 09 වන දින හා 2022 ජූනි 09 වන දින ප්‍රවෘත්ති විකාශයන් අතරතුර අරගලයේ ප්‍රවෘත්ති වාර්තාකරණය කළ ආකාරය පිළිබඳව රූපවාහිනී මාධ්‍ය දෙකක් ඇසුරෙන් විශ්ලේෂණාත්මක අධ්‍යයනයක් සිදු කර ඇත. මෙහි දී පර්යේෂණයේ නියැදිය වශයෙන් රජයේ ප්‍රධානතම රූපවාහිනී මාධ්‍ය ආයතනය වන ජාතික රූපවාහිනියත්, අරගල පුවත් මාධ්‍ය විකාශනයේ ජනප්‍රියතම මාධ්‍ය ලෙස ප්‍රකට වූ සිරස රූපවාහිනී මාධ්‍යයත් පෞද්ගලික මාධ්‍යයන් අතුරින් තෝරා ගන්නා ලදී. දත්ත රැස් කිරීමේ දී මාධ්‍ය අංශ දෙකෙහිම ප්‍රවෘත්ති වාර්තාකරණයේ පටිගත වීඩියෝ පට සහ එම ආයතන නිල වෙබ් පිටු වල පලකළ වීඩියෝ පට භාවිතා කරන ලදී. දත්ත විශ්ලේෂණයේ දී ප්‍රවෘත්ති වාර්තාකරණයේ දී මාධ්‍ය අංශ දෙකෙහිම ප්‍රවෘත්ති සිරස්තල භාවිතය, ගුවන් කාලය වෙන් කිරීම, සහභාගී වූ වර්තාකරුවන් ප්‍රමාණය, ප්‍රවෘත්ති වාර්තාකරණයේ යෙදුණු ස්ථාන, පුවත් සංස්කරණය, පක්ෂග්‍රාහී බව, සජීවී පුවත් විකාශන වලදී භාෂා භාවිතය යන කරුණු යටතේ මාධ්‍ය අංශ දෙක පිළිබඳව අන්තර්ගත විශ්ලේෂණයක් සිදු කරන ලදී. මෙම පර්යේෂණයේ නිගමන සහ නිර්දේශ ලෙස පර්යේෂණයෙන් සනාත වී ඇත්තේ රාජ්‍ය මාධ්‍ය ලෙස ජාතික රූපවාහිනිය ප්‍රවෘත්ති විකාශනය තුළින් අරගලයේ නියම තත්ත්වයන් නිසි ලෙස විකාශනය සිදු කර නොමැති බවත්, රජයට පක්ෂග්‍රාහීව ප්‍රවෘත්ති විකාශනය කර ඇති බවත්ය. ජාතික රූපවාහිනියේ විකාශනයේ දී ඔවුන් තමන්ගේ දෛනික වැඩසටහන්වලට මූලිකත්වය දෙමින් අරගලය සංනිවේදනය උකහා දැක්වීම යටපත් කර වර්තාකරනය සිදු කර ඇති අතර එය රාජ්‍ය විරෝධී කැරැල්ලක් යන මතය නිර්මාණය කිරීමට ද උත්සාහා දරා ඇත. එමෙන්ම රාජ්‍ය මර්ධනය හෙලිදරව් වීම වලක්වීමට තම විකාශනය තුළින් උත්සාහ දරා ඇත. පෞද්ගලික මාධ්‍යයක් ලෙස සිරස රූපවාහිනිය අරගලකරුවන්ගේ ක්‍රියාකාරකම් සෘජුව විකාශනය කිරීමට හා සජීවීව විකාශනය කිරීමට කටයුතු කර ඇති බවත්, සිරස මාධ්‍ය අරගලකරුවන්ට පක්ෂග්‍රාහීව හා ජනතාව අරගලය තුළට ඇද ගැනීමට වචන හා භාෂාව භාවිතා කර ඇති බවත්, අරගලකරුවන්ට විරුද්ධව දැඩි මර්ධනකාරී වැඩ පිළිවෙලක් රජය විසින් ක්‍රියාත්මක කරන බව නිරූපණය කිරීමට තම මාධ්‍යවේදීන් අරගල භූමියේ සිට සජීවී තොරතුරු වාර්තාකරණය හා එම මාධ්‍යවේදීන්ට ද ප්‍රභවර එල්ල වීම සංස්කරණය නොකරමින් විකාශනය කිරීම හා ඔවුන් හා ප්‍රවෘත්ති නිවේදකයන්ගේ ආවේගශීලී වචන භාවිතය මගින් අරගලය නිරවද්‍ය කිරීම හා ප්‍රවෘත්ති විකාශනයේ වැඩි කාලයක් අරගලයේ පුවත් විකාශනයට භාවිතා කිරීම මගින් ප්‍රේක්ෂකයින් වැඩියෙන් ආකර්ෂණය කර ගැනීමට කටයුතු කිරීමට තම මාධ්‍ය භාවිතා කර ඇති බව පර්යේෂණයෙන් සනාත වී ඇත.

මුඛ්‍ය පද : 2022 ගෝලීය අරගලය, වර්තාකරණය, ජාතික රූපවාහිනිය, සිරස රූපවාහිනිය

¹ කළමනාකරණ සහකාර, මානව ශාස්ත්‍ර පීඨය, කැලණිය විශ්වවිද්‍යාලය, ශ්‍රී ලංකාව

Analytical study of syntactic errors of undergraduates in writing Hindi as a second language

Perera W. U. P.

Since language learning is a conscious learning process which usually obtained in a fixed setting, it is not easy as natural language acquisition. Due to difference of learner's social and individual factors which are affecting the learning process of a second language, learner will be encountered difficulties, problems, and challenges in mastering four of language skills - listening, speaking, reading and writing. As a key productive skill writing is significant for language production and it allows user to incorporate new grammar and vocabulary into speech by accompanying with other two skills. Therefore, it is essential to develop knowledge in language structure, idiomatic usages, vocabulary, orthography in exceptional to grammar in developing better skill of writing in communicating through a second language. Sentence as the largest linguistic unit which is used to convey a meaningful idea by assembling words incorporate with the grammar rules of the target language in written communication, significant syntactic errors can be identified within the learners of Hindi as a second language. Henceforth, this study aims at distinguishing those common errors in writing syntax of Hindi by undergraduates of University of Kelaniya whose first language is Sinhala with the purpose of mitigating syntactic errors of undergraduates to create efficient and enthusiastic environment in learning Hindi as a second language. This research is designed to conduct as qualitative inductive study by collecting data through the analysis of sample essays of undergraduates of BA (Hons) in Hindi of University of Kelaniya and literature review of scholarly articles, books, dissertations related to Hindi language, grammar and principles of language teaching and learning.

Key Words: BA (Hons) undergraduates, Hindi Language, Second Language, Syntactic Errors, Writing Skill

**Science, Technology,
Engineering
and
Mathematics**

Protein-protein interaction network analysis for breast cancer biomarker identification using Cytoscape software

Fernando. F.¹, Mudalige. H.^{1*}

Breast cancer is a heterogeneous disease and the leading cause of mortality among women worldwide. Early diagnosis is a key to eradication of breast cancer. In this study, protein-protein interaction network analysis distinguished the most significant genes involved in cancer progression that may act as potential biomarkers in the early detection of breast cancer. 200 proteins related to breast cancer were retrieved from the STRING database and analyzed by Cytoscape 3.8.2. The significant clusters were obtained from Molecular Complex Detection (MCODE). Hub gene analysis using Degree, Edge Percolated Component (EPC), Maximum Neighborhood Component (MNC) and Bottleneck calculation methods ranked the top ten significant genes through CytoHubba. Further, crucial genes based on the analysis of seed proteins and hub genes were determined and enriched by ClueGo v2.5.8 via gene ontology and Kyoto Encyclopedia of Genes and Genomes (KEGG) pathways. Eight significant genes were identified. Consequently, tumor protein p53 (TP53), MYC, estrogen receptor-1 (ESR1) and AKT serine/threonine kinase-1 (AKT1) were identified as significant hub genes, whereas caspase-8 (CASP8), breast cancer gene-2 (BRCA2), poly (ADP-ribose) polymerase-1 (PARP1) and NIMA related kinase-10 (NEK10), were distinguished as seed proteins. ClueGo output revealed four main functions: response to gamma radiation, regulation of mitochondrial membrane potential, endometrial cancer and central carbon metabolism in cancer. Crucial genes identified in this study offer a potential biomarker panel for breast cancer. Further investigation and validation of these genes is required to assess the true potential of these genes to serve as early markers of breast cancer.

Keywords: MCODE, CytoHubba, ClueGo, Hub genes, Bottleneck, Seed proteins

¹ BMS, School of Science, Sri Lanka
*heshani.m@bms.ac.lk

Green synthesis and detection of antioxidative, photocatalytic and antibacterial properties of silver nanoparticles synthesized from *Psidium* spp. Leaves extract

Rathnayake A.¹, Kandiah M.^{1*}

In the ever-growing field of nanotechnology, synthesis methods that use bioproducts have been proven to be a safe, non-toxic alternative to toxic chemical compounds and traditional ways of manufacture. The research presented was performed to synthesize silver nanoparticles using the green synthesis method from six species of *Psidium* (Guava) leaf extracts. Five of six samples produced silver nanoparticles (AgNPs) using the optimum heating condition at 90°C for 1 hour. The AgNPs were observed under a transmission electron microscope at the Sri Lankan Institute of Nanotechnology (SLINTEC), Homagama, to determine the morphological features, which showed circular nanoparticles of 45 nm. The band-gap energy (2.95 eV) proved that the synthesized guava AgNPs were indeed semiconductors. Water extracts tested for phytochemicals (flavonoids, quinones, carbohydrates, proteins, saponins, steroids, tannins, terpenoids and anthraquinones), showed all positive results for the apple guava and variegated guava samples. The antioxidant content of AgNPs and water extracts were determined using Total Flavonoid Content (TFC), Total Phenolic Content (TPC), Total Antioxidant Content (TAC) tests and radical scavenging methods such as DPPH and IC50. Significant difference of antioxidant activity between AgNPs and water extracts was demonstrated by ONE-WAY ANOVA analysis at $P < 0.05$. There is a significant difference in TFC and TPC between AgNPs and water extracts although, a considerable difference between AgNPs and water extracts were not seen during TAC testing ($P > 0.05$). The water extracts showed higher TPC, TAC, DPPH and IC50 while the AgNPs showed higher TFC. Pearson correlation demonstrated a strong positive (0.82) correlation between TAC and TPC demonstrating a simultaneous increase of both variables. Both TFC vs TAC (-0.34) and TPC vs TFC (-0.28) relationships had weak negative correlations. The degradation rate of methyl-red dye measured the photocatalytic activity of the AgNPs. The results were compared between two concentrations (100 ppm and 4000 ppm), with and without a catalyst. The degradation rate was highest with the sample of 4000 ppm with catalyst ($R^2 = 0.74$). The antibacterial activity of the water extract and AgNPs were determined using the well diffusion method for *E. coli* and *S. aureus*. Water extracts showed higher zones of inhibition than AgNPs. ONE-WAY ANOVA analysis carried out on zones of inhibition observed by water extracts and AgNPs against *E. coli* and *S. aureus* showed no significant difference. The results obtained by the tests carried out on the *Psidium* water extracts and AgNP samples provide biocompatible solutions to antimicrobial therapies and azo-dye degradation due to antioxidative properties that can be used to improve the quality of life.

Keywords: *Psidium*, Guava, AgNPs, Total flavonoid content, Total phenolic content, Total antioxidant content, DPPH, *E. coli*, *S. aureus*.

¹ School of Science, BMS

* mathi@bms.ac.lk

Investigation of toxic metals contamination status in red raw rice (Bg 350) grown in North Central province in Sri Lanka

Kumari M. K. J. K.¹, Premaratne W. A. P. J.^{1,2}, Perera P. L. R. A.¹, Perera W. P. R. T. ³,
Liyanage J. A.^{1,1}

Red raw rice consumption is high due to its nutritional properties. The chemical components of food are correlated with their ability to sustain better human health. Rice is the staple food of Sri Lanka. Although it is a good source of nutrients in a diet, its consumption can also lead to exposure to toxic metals due to environmental pollution. Rice is grown extensively in the North Central Province (NCP) where the prevalence of chronic kidney disease of unknown origin (CKDu) is high. This study was aimed to determine the toxic metal content such as Arsenic (As), Cadmium (Cd), and Lead (Pb) in domestically grown red raw rice in NCP and assess the risk of these values to human health. A total of 35 samples of red raw rice were obtained from farmers in NCP during Yala growing cycle in 2021 based on the eight sampling sites. As, Cd and Pb levels were analyzed by Inductively Coupled Plasma-Mass Spectrometry (ICP-MS). The potential health risk was estimated by Estimated Daily Intake (EDI). The mean Pb levels in red raw rice were higher than the FAO/WHO allowable limits (Pb-200 µg/kg) in all the selected areas except the Rambewa area. The highest mean Pb concentration was recorded in the Horowpathana area as 429.93±100.93 µg/kg. As and Cd values were within FAO/WHO allowable limits (As-200 µg/kg, Cd-400 µg/kg). The highest mean value of as was recorded in the Medirigiriya area, and it was 97.72±18.19 µg/kg. The highest Cd level was recorded in the Horowpathana area as 60.70±24.39 µg/kg. The estimated daily intake (EDI) values are also significantly lower than the Tolerable Daily Intake (TDI) (Pb-250 µg/day, Cd-62 µg/day, As-3 µg/day). Dietary exposure is the most common route through which these toxic metals enter the human body. Long term consumption of red raw rice causes to accumulate the toxic metals in body tissues and generates adverse health effects of residents in selected CKDu prevalent areas in NCP. It is suggested that further studies are needed to get a more comprehensive idea on the public health concerns of toxic metals due to red raw rice consumption in Sri Lanka.

Keywords: CKDu, Contamination, Toxic metals

¹ Department of Chemistry, Faculty of Science, University of Kelaniya, Sri Lanka

² CKDu Information and Research Centre, University of Kelaniya, Sri Lanka

³ Department of Indigenous Medical Resources, Faculty of Indigenous Health Sciences and Technology, Gampaha Wickramarachchi University of Indigenous Medicine, Sri Lanka

*mkjkawshi@gmail.com

An ecological approach for the green synthesis of silver nanoparticles using leaf extracts of six species of genus *Adiantum* and assessing their antibacterial, antioxidant and photocatalytic activity

Samarasinha S.¹, Kandiah M.^{1*}

Biogenic synthesis of nanoparticles (NPs) is an efficient replacement of chemical and physical synthesis systems burdened with heavy cost and toxicity. Moreover, eco-friendly synthesis of metallic NPs is currently flourishing due to its wide applications in many fields of science, may it be in medicine or the sustainable development of the environment. This research focuses on the first report of synthesis of metallic silver nanoparticles (AgNPs) which were biosynthesized using six species of the genus *Adiantum* commonly known as Maiden-hair ferns. The six species which were utilized for the synthesis possess their own specialized uses in ethno medicine in different regions of the world ranging from Asia to Europe. While all six samples produced AgNPs they were first optimized under different time and temperature scales. Water extracts of the plant sample and AgNPs were assessed for antioxidant activity via Total Flavonoid Content (TFC), Total Phenol Content (TPC), Total Antioxidant Capacity (TAC), DPPH and IC50 assays. Photocatalytic activity of AHI (*Adiantum hispidulum*), the best sample of synthesized nanoparticles, was observed by the degradation of methylene blue. Antibacterial activity was tested using two common bacterial species *Escherichia coli* and *Staphylococcus aureus*. The TPC, TFC and TAC assays indicated high antioxidant capacity in synthesized AgNPs but contradictorily DPPH and IC50 showed lower antioxidant activity. The assessment of photocatalytic activity against methylene blue dye showed different rate constants for 100 and 500 ppm samples insinuating that concentration may enhance rate of degradation. TEM results of AHI AgNPs showed that their shapes as spherical, rod shaped, rectangular and triangular NPs. The sizes varied from 15nm-50nm. Antibacterial activity of AgNPs was higher in both *Escherichia coli* and *Staphylococcus aureus*. Thus, AgNPs biosynthesized from decorative and wild-grown species of genus *Adiantum* of which extraordinary medicinal and antibacterial properties have not been grasped by many is applicable in many industries around the world and can aid in the sustainable maintenance of the environment with nanotechnology.

Keywords: Nanoparticles, DPPH, Green-synthesis, Eco-friendly, Antibacterial

¹ School of Science, 591, Galle Road, Colombo 06, Sri Lanka

* mathi@bms.ac.lk, BMS

Development of expanded graphite from vein graphite via electrochemical exfoliation with sodium sulfate as an electrolyte

Wimalasoma S. M. T. D.¹, Naranpanawa H. M. H. D. K.², Amaraweera T. H. N. G.^{1*}
Wijayasinghe H. W. M. A. C.¹

Vein graphite is a promising anode material for rechargeable lithium-ion batteries. Since lithium ions are scarce and expensive, research and development are focused on sodium and potassium rechargeable batteries. However, graphite structure should be modified through expanding the interlayer spacing to facilitate intercalation/de-intercalation of the bigger ions related to these future rechargeable batteries. Among the various methods, the electrochemical exfoliation process has been identified as a promising method to structural modification of the graphite to produce expanded and exfoliated graphite. Electrochemical exfoliation can be performed at room temperature within a shorter period with better efficiency. Hence, it is a more cost-effective and environment-friendly method that consumes less energy compared to mechanical and thermal exfoliation methods. However, detailed information on the investigations of electrochemical exfoliation of vein graphite are limited. Therefore, this study aims to investigate the possibility of producing expanded graphite from Sri Lankan vein graphite using electrochemical exfoliation. Electrochemical exfoliation of graphite rod (1 cm x 10 cm), cut from the vein graphite was carried out using 1 mol dm⁻³ Na₂SO₄ as an electrolyte and a Pt rod as a reference electrode under 10V DC voltage, for 30 minutes. The developed materials were characterized by X-ray diffractometer (Rigaku Ultima IV, Cu K_α radiation), Raman spectroscopy (Renishaw Invia, 514 nm laser), particle size analyzer (Horiba Nanopartica SZ-100), and Fourier-transform infrared spectroscopy (Thermoscientific Nicolet is 50, KBr pellet method). Crystallographic characterization using X-ray diffractometry revealed that the interlayer spacing of graphite had increased from 0.33859 nm to 0.33986 nm after the electrochemical exfoliation process. The ratio of the intensity of the D peak and G peak (I_D/I_G) of Raman spectroscopy was used to estimate the average defect density on the graphite surface after the electrochemical exfoliation. I_D/I_G of the edge plane of the graphite increased from 0.48 to 1.27 after the exfoliation. Similarly, the I_D/I_G of the basal plane of the graphite increased from 0.17 to 0.96. This reveals that the average defect density on the graphite edge and basal surface increased after the electrochemical exfoliation. Particle size analysis of expanded graphite was calculated by using the laser diffraction method. A median particle size of 1139.4 nm and polydispersity index value of 0.941 were reported for the exfoliated sample. Fourier-transform infrared spectroscopy analysis confirmed the oxidation of the graphite due to electrochemical exfoliation. Therefore, this study reveals the potential of producing expanded graphite by electrochemical exfoliation of vein graphite using Na₂SO₄ as an electrolyte. Further, material characterization and optimization of parameters such as electrolyte concentration and DC voltage, are currently undergoing to obtain expanded graphite for the investigations in intended rechargeable battery applications.

Keywords: Vein graphite, Electrochemical exfoliation, Expanded graphite, Sodium sulfate, Rechargeable batteries

¹ Department of Applied Earth Sciences, Uva Wellassa University, Badulla, Sri Lanka

² National Centre for Advanced Battery Research, National Institute of Fundamental Studies, Kandy, Sri Lanka

* gayani@uwu.ac.lk

Green synthesis of silver nanoparticles using five varieties of *Mirabilis Jalapa* flower extracts; evaluation of antioxidant, antimicrobial and photocatalytic activity

Kandiah M.^{1*}, Perera S.

Nanoparticles are small molecules (1-100nm) with extra-ordinary physiochemical properties. Characteristic properties of metallic-nanoparticles have led to an upsurge of interest. This study aims at green-synthesis of silver-nanoparticles (AgNPs) using variants of *Mirabilis jalapa* flower extracts and evaluation of their antioxidant, antimicrobial and photocatalytic activity. In the process of bottom-up synthesis of AgNPs, water was used in extracting the biomolecules which function as reducing, capping and stabilizing agents. Several phytochemical tests including Molisch's and Millon's test were conducted to confirm the presence of phytochemicals. In the study, AgNPs attained within 24h at room-temperature depicted a dark brown color change, visually confirming AgNP synthesis. UV-visible spectrum gave an absorption maximum at 480nm that corresponded with the surface plasmon resonance of silver. SEM analysis showed needle and spherical shape AgNPs ranging from 50-70nm. Total Flavonoid Content (TFC), Total Phenolic Content (TPC) and Total Antioxidant Capacity (TAC) were analyzed by Aluminum Chloride (AlCl₃) colorimetric method, Folin Ciocalteu reaction, and Molybdenum reduction reaction respectively. DPPH assay was conducted to study free-radical scavenging activity. One-way ANOVA statistical analysis was used to analyze the TFC, TPC, TAC and antibacterial activity variance between water extracts and the AgNPs. Antioxidant activity of AgNPs were significantly higher than the water extracts. The relationship between TFC, TPC and TAC was expressed using Pearson correlation (correlation >0.90). The synthesized AgNPs were classified as semi-conductors and the photocatalytic degradation of methyl-orange using 4000ppm of W-AgNPs (Rate constant=0.2501) in the presence of NaBH₄ was faster than 267ppm of W-AgNPs (Rate constant=0.0103). Antibiotic activity testing was carried out by following the well diffusion technique. The water extracts and W-AgNPs showed high antibacterial activity against *E. coli* and *S. aureus*, even though there was no significant difference. Thereby, AgNPs synthesized using varieties of *Mirabilis jalapa* flower extracts could produce promising results in medical research in developing treatment against free-radical induced diseases, antibiotic resistant bacteria and degradation of azo-dyes in industrial wastewater, to improve living standards.

Keywords: Antimicrobial activity, Antioxidants, Eco-friendly, *Mirabilis jalapa*, Nanoparticles, Photocatalytic, Phytochemicals, Silver-nanoparticles.

¹ University of Kelaniya, Sri Lanka

* vinodanijayawardana1210@gmail.com

Green synthesis of silver nanoparticles using *Cinnamomum verum* leaf extracts and determination of their antioxidant, antimicrobial activity and photocatalytic activity

Kandiah M.¹, Shahna S.

With the rapid development of Nanotechnology, its applications have influenced on all sectors of human life and opened up a spectrum of research opportunities. Green synthesis of nanoparticles had gained special attention as they are ecofriendly, non-toxic, and cost effective. In this study, five varieties of *Cinnamomum verum* leaf extracts were used for the synthesis of silver nanoparticles (AgNPs) (*Cinnamomum* Sri Gemunu, *Cinnamomum dubium*, *Cinnamomum* Sri Wijaya, *Cinnamomum sinharajanense* and *Cinnamomum revulorum*). The leaf samples were collected from Cinnamon Research Institute in Matara, Sri Lanka. The leaf extracts were obtained after incubating the air-dried samples at 60°C for 30 minutes with distilled water. The extracts were mixed with AgNO₃ and incubated at 60°C, 90°C and at room temperature, and all five varieties indicated a color change to pale brown confirming the presence of AgNPs and indicated a distinct peak from 420-480 nm when characterized by UV spectrophotometry. Phytochemical tests for carbohydrates, amino acids, saponins, tannins, quinones, terpenoids and glycosides were carried on the leaf extracts and antioxidant activity was determined by TPC, TFC, TAC, DPPH and IC₅₀ assays. The results from these assays showed a high antioxidant activity in AgNPs compared to its water extracts. A dried smear of AgNP sample was dissolved with distilled water and sent to Sri Lanka Institute of Nanotechnology (SLINTECH) for Scanning electron microscope (SEM) analysis. This resulted in spherical particles of 50 nm, and they all behaved as semiconductors. The antimicrobial activity against *E. coli* and *S. aureus* was determined by well diffusion technique with saline as a negative control and Gentamycin as a positive control. There was no significant difference in the antimicrobial activity of AgNPs and the water extracts. At two different concentrations, 266 ppm and 4000 ppm, photocatalytic activity was determined for AgNPs using methylene blue under UV and sunlight. AgNPs showed a better degradation of methylene blue at 266 ppm with and without the catalyst (NaBH₄). Finally, all the results concluded that *Cinnamomum verum* is a good source of nanoparticle synthesis and can be useful in medical research and to create an ecofriendly environment.

Keywords: Silver nanoparticles, Green synthesis, Cinnamon leaf, Antioxidant, Antimicrobial

¹ vinodanijayawardana1210@gmail.com, University of Kelaniya, Sri Lanka

Identification of practical problems related to the use of emails as a means of communication in telework at institutions in Sri Lanka

Pothuhera A.^{1*}, Pathum A.

Most office work in Sri Lankan institutions had to be done without using paper due to several reasons in the first half of the year 2022. The main reason was the economic crisis occurred as a result of the economic malpractices and the poor management of the governing bodies of the country. During the Covid 19 pandemic period, the governmental institutions were instructed to reduce the use of paper for office work since it could prevent or reduce the spread of the Corona virus assisted by the transportation of letters, documents, papers, etc. within and among offices. During that time, there was the option to choose whether to use paper for office work or not. But during the economic crisis in 2022, paper was not readily available in the market. Therefore, the offices had to devise strategies to minimize the use of paper. One such strategy was to use emails as much as possible for communication instead of using letters. This saves paper used for the letter and the envelope. In addition, there are several other advantages of using emails. It is cost effective, time saving and reaches the receiver in no time, evident, and can be reached at any location without physically going to the workplace. But there are several practical problems arising with the use of emails as a means of communication in telework scenario. A survey was carried out by interviewing fifty officers and clerical staff members in both state and private sector institutions to identify the practical issues related to the matter. The reported practical issues related to the use of emails were poor knowledge in technology, power cuts, unavailability of devices like desktop computers, laptop computers, smart phones, etc., expenses for Internet supply and the maintenance and purchase of technical devices, poor Internet coverage, poor Internet connection speed, insufficient fluency in English, health issues resulted from overuse of computers for a considerable period every day, etc. The majority i.e. 82% of the interviewees have taken measures to overcome the above-mentioned practical issues that have resulted in stress at work. Some of them have purchased technical devices such as solar panels, routers, laptop computers, tablet PCs, etc. spending huge amounts of money, have followed courses to learn about technology, have started to improve English language skills and have taken precautions such as wearing protective glasses to minimize the health issues related to eye sight. Although the employees are putting extra effort to continue telework using emails as a means of communication in their occupation, the employers should also take measures to mitigate the practical issues arising with telework.

Keywords: Telework, Communication, Emails, Practical problems, Employees

¹ University of Kelaniya, Sri Lanka

* amap@kln.ac.lk

Adsorptive removal of Cd (II) from aqueous solutions by sand/graphite oxide nano-composites: characterization, isotherm, and kinetic studies

Perera W. P. R. T.^{1*}, Perera P. L. R. A.², Kumarasingha A. R.³, Liyanage J. A.⁴

Core-shell absorbent granules were developed by coating commercial sand gravels with graphite oxide (few-layer oxidized graphene sheets). Graphite oxide (GO) is synthesized chemically from vein graphite, a rare form of high-purity natural graphite (NVG). Modified Hammer's method was followed in order to synthesize graphene oxide from the NVG. Repeated coatings of graphite oxide on the sand followed by low temperature (120 °C) thermal pyrolysis resulted in core-shell granules with a hierarchical structure in which sand gravels are covered by graphite oxide layers. Five times GO coated water stable sand/graphite oxide nano-composites (M-S/GO) were developed for further adsorption studies. The adsorption performance and mechanism of Cd (II) removal were investigated and FT-IR, SEM, EDX, and XPS were used to characterize the (M-S/GO) as spectroscopic and microscopic characterization methods. Optimization studies were carried out to find the effective pH of the media, dosage, initial concentration of Cd (II), and contact time that reached the equilibrium. Apart from that, the models of kinetics (pseudo-first order and pseudo-second order), and isotherms (Langmuir and Freundlich) were introduced. Characterization findings indicated that un-uniform graphene oxide coatings had been constructed on the sand surface and the surface of the nano-composite comprised of oxygen-based functional groups. Under optimum conditions (0.08 g/L of dosage, 65 mg/L initial Cd concentration, 120 min of contact time), the M-S/GO removed 93.8% of Cd (II) from simulated water at pH 8.0 (30 ± 2 °C) and the process reached equilibrium after 120 minutes. The adsorption capacity of Cd (II) was augmented when increasing the pH of the medium up to pH=8, and then it tended to reduce. Further, the experimental data have been fitted with the Langmuir isotherm model indicating that monolayer adsorption of Cd (II) occurs on the surface of M-S/GO. Apart from that, M-S/GO had a maximum adsorption capacity (mg/g) (Q_{max}) value for Cd (II) adsorption (16.12 mg/g) than sand and GO, the equilibrium parameter (R_L) value in this study was 0.071, which indicates that Cd (II) adsorption onto the surface of the M-S/GO is favorable. The experiment kinetic data were best fitted to a pseudo-second-order kinetic model indicating that Cd (II) has adsorbed onto the surface of the M-S/GO by a chemical sorption mechanism. These findings imply that M-S/GO could be used as an effective adsorbent for removing Cd (II) from contaminated water sources. More research is required to determine the reusability of M-S/GO in the adsorptive removal process.

Keywords: Adsorption, Cadmium, Graphene oxide, Isotherm, Kinetics, Sand

¹ Department of Indigenous Medical Resources, Faculty of Indigenous Health Sciences and Technology, Gampaha Wickramarachchi University of Indigenous Medicine, Sri Lanka

² Department of Chemistry, Faculty of Science, University of Kelaniya, Sri Lanka

³ Department of Physics, Faculty of Applied Sciences, University of Sri Jayewardenepura, Sri Lanka

⁴ CKDu Information and Research Centre, University of Kelaniya, Sri Lanka

* wprtp@gwu.ac.lk

Structural analysis of $\text{LiNi}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$, $\text{Li}_{0.96}\text{Na}_{0.04}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$ and $\text{Li}_{0.96}\text{K}_{0.04}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$ materials synthesized by Pechini method

Fernando W. T. R. S.^{1*}, Amaraweera T. H. N. G.², Wijayasinghe A.¹

Layered tri-transition metal oxides, specially $\text{LiNi}_{1/3}\text{Co}_{1/3}\text{Mn}_{1/3}\text{O}_2$ (NMC 333), have become a promising alternative to LiCoO_2 electrode material in the rechargeable Lithium-Ion Battery (LIB). The electrochemical performances of NMC 333 mainly depend on its crystallographic structural properties including lattice parameters, the unit-cell, c/a ratio, volume, crystallite size (D), dislocation density (δ), and lattice strain. This study aims to synthesize $\text{LiNi}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$, $\text{Li}_{0.96}\text{Na}_{0.04}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$, and $\text{Li}_{0.96}\text{K}_{0.04}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$ materials and study their structural properties. The Pechini method was used for powder synthesis in this study. The synthesized materials were characterized using X-ray diffraction (XRD). X-ray characterization confirmed the formation of only the single-phase layered hexagonal lattice ($\alpha\text{-NaFeO}_2$ -type) structure without any impurity phase for all these prepared materials. Interestingly, while confirming the formation of layered structures, a better splitting of the (006)/(102) and (108)/(110) peaks appeared for $\text{Li}_{0.96}\text{K}_{0.04}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$ than that of $\text{LiNi}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$ and $\text{Li}_{0.96}\text{Na}_{0.04}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$ in the diffractograms. The lattice parameters, i.e. a , c , c/a , the unit-cell volume, the crystallite size (D), and dislocation density (δ) are $2.8641(\text{\AA})$, $14.2143(\text{\AA})$, 4.9629 , $100.979(\text{\AA}^3)$, 77.45 nm , $1.666 \times 10^{14} \text{ m}^{-2}$, for $\text{LiNi}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$. While they are $2.8675(\text{\AA})$, $14.2317(\text{\AA})$, 4.9630 , $101.347(\text{\AA}^3)$, 85.06 nm , $1.382 \times 10^{14} \text{ m}^{-2}$ for $\text{Li}_{0.96}\text{Na}_{0.04}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$ and $2.869(\text{\AA})$, $14.2421(\text{\AA})$, 4.9641 , $101.528(\text{\AA}^3)$, 128.38 nm , $0.606 \times 10^{14} \text{ m}^{-2}$ for $\text{Li}_{0.96}\text{K}_{0.04}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$, respectively. It is also observed that the lattice parameters, the unit-cell volume, c/a , and the crystallite size are increased with the substitution of Li^+ by Na^+ and K^+ . It may be due to the radii of Na^+ and K^+ are bigger than that of Li^+ and that will pave the way for increasing the interlayer space of the substituted materials with the substitution of bigger ions. The c/a ratio constitutes a direct indication of the cation mixing. $\text{Li}_{0.96}\text{Na}_{0.04}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$ and $\text{Li}_{0.96}\text{K}_{0.04}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$ exhibit higher c/a values than $\text{LiNi}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$, supporting the observation that the substituting bigger ions such as Na^+ and K^+ into $\text{LiNi}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$ suppresses the cation mixing and forms a well-defined layered structure. The micro-strain calculated for the $\text{LiNi}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$, $\text{Li}_{0.96}\text{Na}_{0.04}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$, and $\text{Li}_{0.96}\text{K}_{0.04}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$ are 1.38×10^{-3} , 2.17×10^{-3} and 1.46×10^{-3} , respectively. This implies a slight difference in the crystallinity of the materials, as the micro-strain was slightly affected by substituting Na^+ and K^+ . Crystallite size (D) was 77.45 nm , 85.06 nm , and 128.38 nm for $\text{LiNi}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$, $\text{Li}_{0.96}\text{Na}_{0.04}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$ and $\text{Li}_{0.96}\text{K}_{0.04}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$, respectively. It exhibits an increment of crystallite size, indicating a lowering of the dislocation density with the substitution of bigger ions. Altogether, this study reveals that substituting Li^+ with bigger ions of Na^+ and K^+ is improving the structural stability of NMC 333.

Keywords: NMC materials, Na doping, K doping, Li-ion battery, Pechini method

¹ National Centre for Advanced Battery Research, National Institute of Fundamental Studies, Kandy, Sri Lanka

² Department of Applied Earth Sciences, Uva Wellassa University

* roshansff@gmail.com

***In silico* evaluation of coconut milk phenolic antioxidants and their metabolites by human gut bacteria**

Wadanambi P. M.^{1*}, Chamikara V¹, Perera S. M.¹, Seneviratne K. N.¹, Jayathilaka N.¹

Coconut milk (CM) or the aqueous extract of grated coconut meat is used in culinary applications when preparing both vegetarian and non-vegetarian foods in many Asian countries. Despite CM is traditionally known to be beneficial for gut health, scientific evidence supporting such claims is extremely limited. The beneficial properties of phenolic antioxidants on gut microbiota suggest that phenolic-rich CM may also benefit gut health. Human intestinal gut microbiota plays a vital role in metabolizing dietary components that enter the intestinal tract. These metabolites possess molecular characteristics as well as biological activities, pharmacokinetic and toxicity properties that are different from their parent compounds. Due to a lack of experimental data to examine the gut microbial metabolism of phenolic compounds of CM, a computational study was designed to predict its phenolic metabolites. Our previous high-performance liquid chromatography (HPLC) study reported seven phenolic acids in the CM extract. BioTransformer 3.0 web-based tool was used to predict metabolic transformations of the seven phenolic acids by human gut bacteria. *In silico* studies were conducted to predict the antioxidant, intestinal anti-inflammatory, antibacterial activities and toxicity of the phenolic compounds and their metabolites using PASS and ProTox-II web servers respectively. The safety of the phenolic compounds of CM and their metabolites were also evaluated based on the endocrine-disrupting effect and the probability of interaction with multiple human receptors using Endocrine Disruptome web server. The *in silico* analysis of human gut microbial biotransformation predicted the formation of 41 metabolites from 7 parent phenolic compounds present in CM. Most of the parent phenolic acids and the predicted metabolites of CM were shown to have moderate to high antioxidant, intestinal anti-inflammatory activity and antibacterial activity with Probable activity (Pa) > Probable inactivity (Pi) values. Most of the metabolites had a low probability of binding to human nuclear receptors, causing small risks to the endocrine system and posing minimal risk to human health. Moreover, the results revealed that only a few compounds have a weak mutagenic and hepatotoxic potential, while all compounds were devoid of cytotoxicity. However, further *in vitro* and *in vivo* testing is required to confirm the impact of these parent phenolic acids and their metabolites on diverse gut microbes and human health and in promoting CM as a functional food as well as a vegan replacement for cow's milk.

Keywords: Coconut milk, Human gut microbiota, Gut microbial transformation, Endocrine disruption, Toxicity

¹ Department of chemistry, Faculty of Science, University of Kelaniya, Sri Lanka

* pwadanambi@gmail.com

An overview of parametric and non-parametric gene selection methods in classification approaches in microarray data

Gayathri Y. K. K. M. K.^{1*}, Napagoda N. A. D. N.¹

Cancer-causing genetic changes can be inherited from parents and incompatible lifestyles. Breast, lung, colorectal, liver, cervix uteri, thyroid, and skin cancers are the most common cancers worldwide. The root causes of a cancer can be identified by using DNA microarrays. Microarray has been established as an efficient tool for gene expression profiling. Gene expression experiments help to understand the evolution of gene regulation in different organisms. The identification of differentially expressed genes and a marker genes selection are essential steps in cancer gene classification using gene expression data. Therefore, most researchers used parametric and non-parametric methods to reduce the dimension of the microarray data to detect the optimal affected genes of the disease. The parametric test must be used with a few assumptions, and non-parametric methods do not weigh the underlying assumptions of the probability distribution based on the population. The primary goal of our research is to compare parametric and non-parametric gene selection methods with various classification approaches in order to identify the best method(s) for recognizing the genes that contribute to cancer diseases such as breast, leukemia, lung, colon tumor, skin, and prostate cancer, etc. Therefore, gene selection and classification methods are used to improve the performance of the selected genes and detect the accuracy of ranked genes. In past studies, both parametric (the Two-sample t-test, Welch t-test, Euclidean distance, Analysis of Variance (ANOVA), Bayesian) and non-parametric approaches (Wilcoxon rank-sum test, Random permutations, Wilcoxon Mann Whitney (WMW) test, Significance Analysis of Microarray (SAM)) have been employed. Furthermore, the Support Vector Machine (SVM), K-Nearest Neighbor (KNN), decision tree, Naïve Bayes, and Linear Discriminant Analysis (LDA) are well-known classification techniques, and the confusion matrix with accuracy, sensitivity, and specificity can be used to evaluate the performance of classification methods. The Two-sample t-test, WMW test, and SAM methods can be recognized as the most established gene selection methods in past studies. Furthermore, the SVM algorithm is a very effective classification technique even with structured, semi-structured, and unstructured cancer data. In addition to that, the usage of Two sample T-tests with SVM and SAM with SVM methods is simple and less time-consuming. Therefore, our study included an overview of powerful parametric and non-parametric gene selection approaches with suitable classification methods that can be used to identify the top affected genes with a high accuracy rate for identifying cancer genes. The results of past studies have found that the presence of a few top-rank genes effectively supports the identification of disease cells with appropriate, high prediction accuracy. Moreover, the results can be used for diagnostic purposes in clinical practices and patient well-being. The future study can be enhanced by applying a few hybrids of parametric and non-parametric gene selection algorithms with a suitable classification method on cancer datasets to identify differentially expressed cancer genes.

Keywords: Classification, Gene selection, Microarray, Non-parametric, Parametric

¹ Department of Mathematical Sciences, Faculty of Applied Sciences, Wayamba University of Sri Lanka, Kuliyaipitiya, Sri Lanka

* minushigayathri@gmail.com

Micro-textural features of heavy mineral beach placers along the southeastern coast of Sri Lanka: implications for their paleoenvironment

**Sandaruwan G. B. C.^{1*}, Madugalla T. B. N. S.², Adikaram A. M. N. M.², Pitawala H. M. T. G. A.^{1,3},
Udagedara D. T.⁴**

The beach placers are largely composed of resistant heavy minerals and are known as one of the most easily exploitable mineral deposits in the world. Such placers are commonly deposited along the edges of large water bodies due to the gravity separation processes. The southeastern coast of Sri Lanka contains extensive depositional beaches, lagoons, and estuaries, and shows signs for occurrences of valuable mineral placers. We investigated the mineralogy and micro textural features of placer and non-placer sediments in the lagoonal beaches (Periya Kalapuwa, Korai, Komari, Pottuvil and Arugam Kalapuwa) and Heda Oya riverine beach of the southeastern part of Sri Lanka. The study aimed to compare transport and depositional processes, and paleoenvironmental histories of placer and non-placer deposits. The field and mineralogical results revealed that the sediments in the lagoonal shores are black-colored ilmenite placers with abundant ilmenite and accessory zircon while the sediments from Heda Oya riverine shore are red-colored titanium placers with almandine. The non-placer deposits are mostly composed of quartz, albite and magnesian calcite. The micro-textural analyses of 240 quartz grains from placer and non-placer deposits showed the presence of twenty-five predefined micro-textures indicating the prevailed influences of subaqueous-beach, fluvial, aeolian and chemical alteration processes on the sediments. Also, these textures showed a decrease in source-sinking distances and subaqueous beach processes, while an increase in fluvial processes from non-placer, red placer to black placer deposits. Chemical alteration processes such as cracks and solution pits are higher in heavy placer deposits revealing the deposition in the steady low energy environment. Further, the cross-cutting relationships between environment specific micro-textures show crystalline overgrowth cross-cutting on chemically modified surfaces, upturned plates with cracks and solution pits, and large conchoidal fractures cross-cutting on surfaces that contain V-shaped percussion cracks. The cross-cutting relations indicate prevailed pre-aeolian processes and post-chemical alteration processes on placer deposits. Further, they are more recently controlled by subaqueous beach processes with sparse aeolian contributions. Large conchoidal fractures, arcuate and straight steps micro-textures, and mineralogical contents of the placer deposits indicated crystalline rock sources. Hence, these placer deposits probably have been derived from granitic gneiss, granodioritic gneiss, charnockites and garnet-bearing granulites of the Precambrian Vijayan Complex and Highland-Vijayan tectonic boundary zone.

Keywords: Beach placers, Micro-texture, Paleoenvironment, Quartz grains, Scanning electron microscope, Southeast coast of Sri Lanka

¹Postgraduate Institute of Science, University of Peradeniya, Sri Lanka

² Department of Physical Sciences, Faculty of Applied Sciences, South Eastern University, Sammanthurai, Sri Lanka

³ Department of Geology, Faculty of Science, University of Peradeniya, Sri Lanka

⁴ Department of Applied Earth Sciences, Faculty of Applied Sciences, Uva Wellassa University, Badulla, Sri Lanka

* chaturangasandaruwangbcs@gmail.com

Investigating temperature dependence of lithium-ion diffusion through the silicon (111) surface

Ranawee R. M. L. H.¹, Samarakoon Y. M. I. B.², Amaraweera T. H. N. G.^{1*},
Wijayasinghe H. W. M. A. C.²

Demand for high energy density rechargeable lithium-ion batteries has drastically increased in the last few decades. Graphite is the most common anode material used for rechargeable lithium-ion batteries. But it possesses less specific energy density hence is difficult to apply for high energy applications. Therefore, many studies to find out high specific capacity anode materials. One of the important high specific capacity, novel anode materials is silicon and its oxidative derivatives. But less diffusivity of lithium ions is one of the major drawbacks of these materials. Since it is very difficult to get the atomic picture of the anode during the lithiation process using analytical methods, computational methods have also been employed. Therefore, this research aims to carry out molecular dynamics simulations on silicon to study the migration of the lithium ions through silicon structure. Silicon model with 111 plane was modeled. X, Y and Z axis lengths of the lattice were around 30 Å, 26 Å and 50 Å respectively. Inside this lattice 896 of silicon atoms and 16 lithium atoms were placed. Modified embedded atom method (MEAM) potential is used to simulate the system by using Large-Scale Atomic/Molecular Massively Parallel Simulator (LAMMPS) source code. After model validation, optimum voltage of diffusion for lithium ions, their mean square displacement (MSD) and diffusion coefficient (DC) are calculated. The optimum diffusion voltage for lithium ions is 2.1 V Å⁻¹. The DC of the lithium ions in silicon (111) surface at 300 K is $6.13 \times 10^{-13} \text{ cm}^2 \text{ s}^{-1}$ which is very close to the experimental values obtained in previous studies. Then the model was subjected to different temperatures (250 K to 450 K) while lithium ions were diffusing through 111 surfaces. DC of lithium ions was calculated at 10 K temperature gaps. Although there is an increment of the DC for lithium atoms with respect to temperature increments, it is not a stereotypical increment. Additionally, it has shown 93.85 % increase in DC for lithium ions when it goes from 250 K to 450 K. This shows a drop in friction acts on lithium atoms from the silicon environment as temperature rises.

Keywords: Silicon, Lithium, Lithium-ion battery, LAMMPS, DC, MSD

¹ Department of Applied Earth Sciences, Uva Wellassa University of Sri Lanka

² National Center for Advanced Battery Research, National Institute of Fundamental Studies

* gayani@uwu.ac.lk

A comparison of food contamination by heavy metals/metalloids in CKDu prevalent areas and a reference area; A study in Sri Lanka

Perera P. L. R. A.^{1*}, Perera W. P. R. T.², Liyanage J. A.^{2,3}, Premaratne W. A. P. J.^{1,1}

During the past two decades, so many studies have been involved in exploring the relationship between the prevalence of chronic kidney disease of unknown etiology (CKDu) and exposure to toxic metals. These studies revealed signs of chronic low levels of toxic metal exposure in Sri Lanka. To assess the risk of negative health effects and propose appropriate public health interventions, novel research studies will be very beneficial. This assessment was performed to study the toxic metal contamination status in domestic rice, leafy vegetables, legumes, and citrus fruits in the CKDu prevalence area in north central province in Sri Lanka and to compare those levels with a reference area in the Eastern province in Sri Lanka where CKDu is not prevalent. CKDu hot spots areas Maradankulama- Mahakanadarawa in the Anuradhapura district, Sri Lanka was selected for sampling and Buddhanga Grama Niladhari area in Ampara district was selected as a reference site. Food samples, including (*Oryza sativa*; n=25, *Centella asiatica*; n=25, *Citrus crenatiflora*; n=18, *Vigna radiata*; n=10) were collected from the villager's own paddy fields and home gardens of the CKDu suspected patients according to the random stratified sampling method in both areas and the collected food samples were digested by microwave digestion according to the standard procedures and the concentrations of metal ions in food samples, including Cadmium, Nickel, Chromium, Copper, Iron, Manganese, Lead, Zinc, Arsenic, and Calcium, were measured using Inductive Coupled Plasma technique (ICP). As a results of the study, mean As and Pb concentrations of *Oryza sativa* (As-0.15 mg/kg, Pb-3.10 mg/kg) and *Citrus crenatiflora* (As-0.15 mg/kg, Pb-0.47 mg/kg), Pb (0.65 mg/kg) and Cd (0.05 mg/kg) content in *Centella asiatica*, and mean concentrations of As (0.14 mg/kg), Pb (9.25 mg/kg) and Cu (57.8 mg/kg) in *Vigna radiata* have exceeded the permissible limits given by the FAO and WHO, 2011: As-0.1 mg/kg, Pb-0.1 mg/kg, Cd-0.05 mg/kg, Cr-2.3 mg/kg, Cu-40 mg/kg. However, none of the food samples collected from the reference areas has exceeded the permissible limits of analyzed heavy metals/metalloids. THQ (Target Hazard Quotient) values of Cr have exceeded the threshold values for all food species. Furthermore, Pb is also regarded as a toxic element and THQ values of Pb in *Oryza sativa* and *Vigna radiata* are noticeably high. Meanwhile, THQ values of the food samples in the reference areas have not exceeded the threshold values. According to the outcome of the study, there is a noticeable difference reported in toxic metals contamination status between the CKDu-prone areas and the reference area. Therefore, the consumption of analyzed rice, leafy vegetables, and legumes was estimated to be risky, and their regular consumption may boost the likelihood of CKDu prevalence in those areas. Further studies are required to monitor and assess heavy metals and metalloids in soil, and fertilizers to find the pathways of contamination of food by toxic metals.

Keywords: CKDu, Heavy metals, Food safety, Chronic kidney disease, Nephropathy, Arsenic, Lead, Cadmium

¹ Department of Chemistry, Faculty of Science, University of Kelaniya, Sri Lanka

² Department of Indigenous Medical Resources, Faculty of Indigenous Health Sciences and Technology, Gampaha Wickramarachchi University of Indigenous Medicine, Sri Lanka

³ CKDu Information and Research Centre, University of Kelaniya, Sri Lanka

*rajitha_2019@kln.ac.lk, rajithperera.com

Prevalence of known diabetes in Sri Lanka: results from the Sri Lanka demographic and health survey 2016

Munasinghe M. A. H. C.¹, Nugawela M., Jayasundara D. D. M., Dissanayaka D. M. P. V., Sivaprasad S.

Diabetes is a major global public health burden. According to International Federation of Diabetes (IDF), Sri Lanka shows an increasing prevalence of diabetes. There is a paucity of contemporary data on the prevalence of diabetes in Sri Lanka. Therefore, this study was conducted to estimate the national and provincial level prevalence of diabetes and establish the demographic risk factors of diabetes in Sri Lanka. We used data from the Sri Lanka Demographic and Health Survey (SLDHS) 2016 conducted by the Department of Census and Statistics Sri Lanka. A total of 106,466 individuals were included in this survey. From the survey data, a total of 71066 individuals aged 20 years and older were identified from all the nine provinces and the diabetes status in the questionnaire was used to define people with known diabetes. Age, gender, ethnicity, religion, education level, smoking history, marital status, urban or rural location, province of residence was included as potential exposures. The outcome was defined as self-reported prevalence of diabetes status. Age adjusted prevalence values were obtained by multiplying the crude age-specific prevalence of diabetes by age-specific weights. Weights were calculated using the Census of Population and Housing (CPH) 2012 data. Multivariable logistic regression was fitted, and Odds Ratios (ORs) were derived to examine the relationship between the covariates and outcome (diabetes status). The age adjusted national prevalence of diabetes is 10.6%. The prevalence of diabetes was higher in women than in men. Provinces with higher GDP (Gross Domestic Product), seemed to have a higher prevalence of diabetes. Prevalence of diabetes was higher in urban residents (14.39%: 95% CI: 13.72% -15.06%) compared to their counterparts in rural (11.38%: 95% CI: 11.10%-11.66%) and estate areas (9.15%: 95% CI: 8.25%-10.04%). The multivariable logistic regression analysis showed that age, urban area, moors, females, province, and high level of education as independent risk factors for diabetes. Moors had 43% increased odds of diabetes compared with Sinhalese (OR:1.43, 95% CI 1.30,1.58). Compared to residing in Rural areas, Urban sector had 19% increased odds of diabetes (OR:1.19, 95% CI (1.11, 1.28)). Females' risk of getting diabetes was 72% higher than males (OR:1.72, 95% CI 1.62,1.82). Individuals who had a high level of education had 10% of increased risk of getting diabetes (OR:1.1,95% CI 1.04,1.17) than others. People living in Western province, were 64% more likely to have diabetes compared to other provinces. Smoking status of the individuals was not related to diabetes in this analysis. The findings clearly show that known diabetes prevalence in Sri Lanka varies between provinces, with most urban and economically developed regions showing a high prevalence of known diabetes. Given the limited resources available in the health system in Sri Lanka, this study highlights how the population can be stratified for efficient optimization of diabetes care in the country.

Keywords: Diabetes, Prevalence, Sri Lanka, Urban, Rural

¹ harshanam@kln.ac.lk, University of Kelaniya, Sri Lanka

Identification of potential inhibitors against prostate cancer metastasis drug target, human fatty acid binding protein-12: An *in silico* study

Wadanambi P. M.^{1*}, Seneviratne K. N.¹, Jayathilaka N.¹

Fatty acid-binding proteins (FABPs) play a vital role in fatty acid metabolism, cell growth and proliferation and cancer development in humans. Recent studies have revealed that FABP-12 can promote prostate cancer through activation of peroxisome proliferator-activated receptor gamma (PPAR- γ) which has previously been reported as a driver of metastasis in prostate cancer. Hence targeting the human FABP-12 might be a therapeutic strategy to control prostate cancer metastasis.

Due to the absence of crystal structure of this protein, a 3D homology model of FABP-12 was generated using crystal structure of human myelin protein P2 (PDB ID: 2WUT, Resolution: 1.85 Å) as the template by Modeller 9.23 software. The hypothetical model showed the backbone root mean square deviation (RMSD) value of 0.128 Å after superimposition with the template. Further, the structural quality of the model was validated through QMEAN, VERIFY3D, ERRAT, PROCHECK and PROSA tools.

Structure based drug discovery of the FABP-12 protein was performed using AutoDock4.2 software with a library of ligands consisting experimentally known FABP family inhibitors (BMS309403 and SBFI-26) and anti-prostate cancer phytochemicals that have been reported earlier. Molecular interactions were explored to understand the nature of intermolecular bonds between ligand and the protein binding site residues using BIOVIA Discovery Studio Visualizer. The *in silico* hepatotoxicity, mutagenicity and cytotoxicity end points for experimentally known FABP family inhibitors and top docked phytochemicals were examined using ProTox-II web server.

The BMS309403 showed the highest binding affinity of -10.02 kcal/mol closely followed by celastrol, SBFI-26 and glycyrrhetic acid with binding affinities of -9.39 kcal/mol, - 9.24 kcal/mol and -9.39 kcal/mol respectively. The inhibition constant (K_i) of BMS309403, celastrol, SBFI-26 and glycyrrhetic acid were 44.94 nM, 131.65 nM, 167.52 nM and 200.62 nM respectively. Moreover, the *in-silico* toxicity results revealed that BMS309403 has a weak hepatotoxic potential. Notably, other three compounds obtained negative results for all toxicity descriptors, implying no severe human side effects. These computational findings indicate that celastrol, SBFI-26, and glycyrrhetic acid have the ability to suppress FABP-12 activity and hence could be utilized as a starting point for future drug development to treat prostate cancer metastasis.

Keywords: FABP-12, Prostate cancer metastasis, Homology modeling, Molecular docking, Celastrol

¹ Department of Chemistry, Faculty of Science, University of Kelaniya, Sri Lanka

* pwadanambi@gmail.com

Identification of phytochemical inhibitors against papain-like protease of SARS-CoV-2: molecular docking, molecular dynamics and absorption, distribution, metabolism, excretion and toxicity (ADMET) study

Wadanambi P. M.^{1*}, Mannapperuma U.², Jayathilaka N.¹

The COVID-19 outbreak has created a huge social and economic disruption worldwide due to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Papain-like protease (PL^{pro}) of SARS-CoV-2 plays a crucial role in viral replication and host innate immunity suppression. Therefore, it is an ideal therapeutic target to develop inhibitors. Thus, the goal of this study was to use virtual screening methods to identify potential phytochemical inhibitors of this dual therapeutic target. Virtual docking was performed for 31 phytochemicals with documented anti-SARS-CoV-1 PL^{pro} activity and two positive controls using AutoDock 4.2 software to determine the binding affinity, inhibition constant and ligand efficiency of each compound within the S3/S4 binding pocket of SARS-CoV-2 PL^{pro} (PDB ID: 6WX4). Based on the docking results, top twelve compounds were subjected to protein-ligand interaction analysis utilizing the Discovery Studio Visualizer software. Physicochemical properties were analyzed using molinspiration web server. Moreover, pharmacokinetics and toxicity descriptors were assessed using pkCSM and StopTox web servers, respectively. Molecular dynamics simulations (MD) were carried out for 100 ns for each top docking complex and PL^{pro} of SARS-CoV-2 inhibitors. Hirsutenone (from *Alnus japonica*), brousoflavan A (from *Broussonetia papyrifera*) and brousochalcone A (from *Broussonetia papyrifera*) displayed the strongest binding affinities (-8.23 kcal/mol, -8.13 kcal/mol and -7.78 kcal/mol), the lowest inhibition constants (920.39 nM, 1.1 μM and 1.97 μM) and the highest ligand efficiencies (0.34, 0.26 and 0.31) among all phytochemicals towards the S3/S4 binding pocket of SARS-CoV-2 PL^{pro}, demonstrating superiority to positive control, GRL0617 while hirsutenone and brousoflavan A exhibited superiority to both positive controls, 3k and GRL0617. In addition, hirsutenone, brousoflavan A and brousochalcone A possessed favorable physicochemical properties satisfying Lipinski's and Veber's rules. Furthermore, *in silico* pharmacokinetics and toxicity predictions revealed that the three phytochemicals are water soluble, non-mutagenic, non-hepatotoxic. These compounds were not toxic for acute inhalation and acute dermal exposure. They also showed no eye irritation, skin irritation or corrosive properties. MD confirmed the stability of brousoflavan A and brousochalcone A. However, hirsutenone showed less stability due to fluctuations during the simulation period. Hence, brousoflavan A and brousochalcone A might be exploited to expedite the drug discovery process against the ongoing COVID-19 infection.

Keywords: COVID-19, Papain-like protease, ADMET, Molecular docking, Molecular dynamics

¹ Department of chemistry, Faculty of Science, University of Kelaniya, Sri Lanka

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

* pwadanambi@gmail.com

Larvicidal and pupicidal activity of *Trichoderma longibrachiatum* (Tl-AgNPs) and *Trichoderma viride* (Tv-AgNPs) mediated silver nanoparticles against dengue vector *Aedes aegypti*

Perera D. S.^{1*}, Amarasinghe L. D.¹, Wickramarachchi S.¹

Dengue and dengue hemorrhagic fever play major public health problems in Sri Lanka, being endemic within the country since 1960s. *Aedes aegypti* vectors transmit dreadful diseases like Dengue, Chikungunya, Yellow fever and Zika causing millions of deaths every year throughout the world. An efficient biosynthesis process for the rapid production of nanoparticles would enable the development of a “microbial nanotechnology” for mass-scale production. In the present study, biological silver nanoparticle synthesis using the endo-lichenic fungus, *Trichoderma longibrachiatum* and *Trichoderma viride*, where the cell filtrate of the fungus will be used as a reducing and stabilizing agent in the process of nanoparticle synthesis and the filtrate is mixed with silver nitrate solutions to obtain nanoparticles. Fungi are attractive agents for biogenic synthesis of silver nanoparticles because they offer high tolerance to metals and are easy to handle. They also secrete large quantities of extracellular proteins that contribute to the stability of the nanoparticles. They also provide good biomass production and do not require additional steps to extract the filtrate. The mycelial mass of fungi is more resistant to agitation and pressure, so it is more suitable for large-scale syntheses. In the present study, larvicidal and pupicidal effects of *T. longibrachiatum* and *T. viride* mediated silver nanoparticles (Tl-AgNPs and Tv-AgNPs) against third instar stage *Ae. aegypti* larvae and pupae were investigated. The fungi were grown in Richards’ broth containing glucose, agar, potassium nitrate, potassium dihydrogen phosphate, magnesium sulphate and ferric chloride. Fungal biomass filtrates obtained after keeping 48 hours with deionized water and the desired weight(10mg) of fungal mass, were mixed with AgNO₃ solution. Synthesized Tl-AgNPs and Tv-AgNPs were characterized by UV-Vis spectroscopy with maximum absorption at 445nm for *T. viride* and 448nm for *T. longibrachiatum*. Transmission Electron Microscopy (TEM) showing the formation of monodispersed spherical shaped particles with a mean diameter ranging from 15 to 25 nm. The color changes from pale yellow to dark brown in the solutions with time indicated the formation of nanoparticles initially. Larval and pupal toxicity tests were assessed according to WHO standard protocol. Data were analyzed using IBM SPSS version 20 software. Probit analysis was carried out to determine the LC₅₀ and LC₉₀ of larvicida and pupicidal effect of Tl-AgNPs and Tv-AgNPs for *Ae. aegypti* after 24 hours and 48 hours of exposure. Study revealed that LC₅₀ for Tl-AgNPs for 24 hours(2.607mg/L) and 48 hours (2.174 mg/L) were higher than LC₅₀ for Tv-AgNPs 24 hours (2.153 mg/L) and 48 hours (1.842 mg/L) exposure time for *Ae. aegypti* larvae. In addition, LC₅₀ value obtained in pupal toxicity tests revealed Tl-AgNps (4.92 mg/L) is higher than that of Tv-AgNPs(4.79 mg/L) for 24 hour exposure time. It concludes that both Tl-AgNPs and Tv-AgNPs could be used as potential larvicidal and pupicidal agents and Tv-AgNPs are more efficient in controlling *Ae. aegypti* larvae and pupae.

Keywords: *Ae.aegypti*, *Trichoderma longibrachiatum*, *Trichoderma viride*, Nanoparticles (NPs), Larvicide, Pupicide

¹ University of Kelaniya, Sri Lanka

* vinodanijawardana1210@gmail.com

Identification of carbazole alkaloids from *Murraya koenigii* as potential main protease inhibitors of SARS-CoV-2 Omicron variant

Wadanambi P. M.^{1*}, Jayathilaka N.¹, Seneviratne K. N.¹

Despite of COVID-19 vaccination, immune escape of new severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) variants has created an urgent priority to identify additional antiviral drugs. In the short span of two years, SARS-CoV-2 has evolved to raise five variants of concern out of which Omicron has currently become the dominant variant all over the world. Targeting main protease (M^{pro}) expressed by SARS-CoV-2 Omicron variant, is a therapeutic strategy for drug development due to its prominent role in viral replication cycle. Leaves of *Murraya koenigii* are used in various traditional medicinal applications and this plant is known as a rich source of carbazole alkaloids. Previous research reports have shown that the leaves, roots and bark of this plant are high in carbazole alkaloids. Many drug compounds containing a carbazolic core have been discovered, and some have demonstrated antiviral action. Thus, this computational study was designed to investigate the inhibitory potential of carbazole alkaloids from *Murraya koenigii* against M^{pro}. Molecular docking was performed using AutoDock Vina software to determine the binding affinity and molecular interactions of carbazole alkaloids and the reference inhibitor (3WL) in the active site of SARS-CoV-2 Omicron variant M^{pro} (PDB ID: 7TLL). The top scoring compounds were further assessed for physicochemical properties and drug likeness, pharmacokinetic and toxicity (ADME/T) properties, antiviral activity, pharmacophore modeling and molecular dynamics (MD). Two carbazole alkaloids namely, koenine (-7.8 kcal/mol) and girinimbine (-7.6 kcal/mol) displayed a unique binding mechanism that shielded the catalytic dyad (His41 and Cys145) of M^{pro} with stronger binding affinities and molecular interactions than 3WL (-7.2 kcal/mol). Furthermore, the two compounds with high affinity displayed favorable physicochemical and ADME/T properties that satisfied the criteria for oral bioavailability and druggability. The pharmacophore modeling study showed shared pharmacophoric features (aromatic ring, hydrophobic area, hydrogen bond donor/acceptor and positively ionizable region) of those compounds for their biological interaction with M^{pro}. During the molecular dynamics simulation of 100 ns, the MD simulation trajectories of root mean square deviation (RMSD), root mean square fluctuation (RMSF) and radius of gyration (Rg) of top two complexes exhibited high stability. Therefore, koenine and girinimbine from *Murraya koenigii*, may have the potential to restrict SARS-CoV-2 replication by inactivating the M^{pro} catalytic activity thus offering potential hits that may be further structurally modified and evaluated *in vitro* and *in vivo* for the discovery of novel SARS-COV-2 M^{pro} inhibitors.

Keywords: Omicron variant, Main protease, Molecular docking, *Murraya koenigii*, Carbazole alkaloids

¹ Department of chemistry, Faculty of Science, University of Kelaniya, Sri Lanka

* pwadanambi@gmail.com

Methylene blue adsorption on coconut vinegar activated wood biochar

Udawattaa M. M.¹, Silva D. S. M.¹, Silva R. C. L. D.^{1*}

Activated wood biochar plays a significant role in water purification. However, many biochar activation methods utilize higher temperatures and corrosive chemicals, which may be expensive and unavailable for rural communities. Therefore, the focus of this study was to examine the ability of Gadumba (*Trema orientalis*) wood biochar activated using natural coconut vinegar to remove methylene blue (MB) dye from aqueous solutions.

Gadumba wood was collected and air dried. Next, they were carbonized (300 °C, 2 h) to produce biochar. For the activation, biochar (<0.5 mm) was soaked in natural coconut vinegar (biochar: vinegar, 1:2 V/V) for 24 hours and completely dried on a hot plate (200 °C). Then they were left to cool to room temperature, washed with deionized water, dried in an oven (80 °C, 8 h) and stored in sealed containers. Effect of initial MB concentration on adsorption was determined by batch studies using a series of MB solutions with concentrations ranging from 50-300 mg/L.

Activated biochar showed a three-fold higher MB adsorption capacity compared to raw biochar. The maximum adsorption capacity of activated biochar increased from 19.63 to 58.27 mg/g, while removal percentage decreased from 98.19 to 48.56% with increasing initial MB concentration. Isotherm data best-fitted to the Freundlich model. Kinetic data best-fitted to both pseudo-second order and intraparticle diffusion models suggesting that the adsorption was governed by a pore filling mechanism where electrostatic attractions were predominant and the rate of the reaction was diffusion controlled. FTIR, XPS and water contact angle measurements showed the increased surface oxygenated functional groups and hydrophilicity of the activated biochar. XPS showed a three-fold increase in O/C atomic ratio after the vinegar treatment. Contact angles of the water droplets placed on raw and activated biochar were in the range of 102–113° and 30–62°, respectively. SEM images did not show significant changes in the porosity of biochar after the activation. This could be due to the mild activation process utilized using a mild acid and low temperatures. Therefore, the enhanced MB adsorption capacity of activated biochar could be attributed to increased surface oxygenated functional groups suggesting coconut vinegar as an abundant and effective activating agent for activating biochar for methylene blue removal.

Keywords: *Trema orientalis*, Biochar, Methylene blue, Adsorption, Water purification, Dye removal

¹ Department of Chemistry, University of Kelaniya, Kelaniya, Sri Lanka

* russel@kln.ac.lk

Identifying cost-effective techniques for commercially growing *Eruca sativa* plants using the Nutrient Film Technique (NFT)

Silva A. M. H.^{1*}, Liyanage H. I. D.¹

Nutrient Film Technique (NFT) is a technique used in hydroponics which uses a very shallow stream (film) of water containing all nutrients needed for plant growth to circulate between the growing channels and nutrient solution tank. Commercial growers use water from various sources (such as city water, well water, and rainwater) to create the nutrient solution, which is then treated using the Reverse Osmosis (RO) method. This method is quite costly and requires some technical knowledge. This study was primarily concerned with identifying a cost-effective method of treating water used to create the nutrient solution. The study site is in Ja-ela, Sri Lanka, and the water was obtained from the city water supply, with temperatures ranging from 30°C to 35°C. *Eruca sativa* plants (n = 160) were grown in two vertical NFT hydroponic systems. Water in the system – 01 was treated using RO filters before making the nutrient solution while water in the system – 02 was allowed to remain in an open tank for 24 hours with an air stone before making the nutrient solution. The same environmental conditions were provided to both systems. The pH range in the nutrient solution was kept between 5.5 and 6.5, electrical conductivity was kept between 1.4 ms and 1.6 ms and the temperature was kept around 27°C. Cooling pads and other simple methods were used to keep this temperature stable. The plants were harvested after 45 days and the weight was measured. The total weight of *Eruca sativa* plants in the system – 01 was 7.56 kg and the total weight of *Eruca sativa* plants grown in the system - 02 was 7.51kg. According to the measurements taken from this study, the city water treatment method without RO filters was identified as a cost-effective technique for commercially growing *Eruca sativa* plants using the nutrient film technique. Although the pH and EC values in the nutrient solution were kept constant, they could not be used for more than two weeks and the nutrient solution must be discharged once every two weeks. Therefore, more research is needed to identify cost-effective, environmentally friendly wastewater treatment methods for treating the wastewater discharge from the hydroponic system and to improve the effectiveness of nutrient film techniques.

Keywords: Hydroponic, Nutrient film technique (NFT), Nutrient solution, Reverse osmosis (RO)

¹ Faculty of Graduate Studies, University of Kelaniya, Sri Lanka

* malithharshana94@gmail.com

Introducing an ED-CdTe nucleation layer on the CBD-CdS layer in solar cell fabrication

Gajanayake G. K. U. P.¹, Silva D. S. M. D.^{1*}, Thanahaichelvan M.²

Developing a cost-effective and efficient thin-film CdS/CdTe solar is vital in resolving the energy crisis in the world. In the fabrication of solar cells, the weak interlayer contact caused by the voids between the window and the absorber layer adversely affected the performance of the device. This study explores the effectiveness of introducing an intermediate ultra-thin CdTe nucleation layer on reducing the Te diffusion into CdS and recombination effect to mitigate layer mismatch between the window and the absorber layer. Herein, the CdS layer was grown on the glass/FTO substrates which were subjected to prior chemical and plasma cleaning processes. In CdS deposition, $\text{Cd}(\text{CH}_3\text{COO})_2$ (0.033 mol/L), $\text{CS}(\text{NH}_2)_2$ (0.667 mol/L) were utilized as cadmium and sulfur precursors while $\text{CH}_3\text{CO}_2\text{NH}_4$ (1.0 mol/L) and NH_4OH (25%) were used to adjust the pH in the bath at 90 °C. The deposited glass/FTO/CBD-CdS samples were sonicated and dried with N_2 flow. Next, an ultrathin CdTe nucleation layer was electrodeposited in an electrolyte containing 1.0 mol/mL CdSO_4 and 1.0 mmol/mL TeO_2 in pH 2.3 at 65 °C for 40 s on the glass/FTO/CBD-CdS. Herein, the graphite sheet (counter electrode), saturated calomel electrode (reference electrode) and glass/FTO/CdS substrate (working electrode) were used at a cathodic deposition potential of -650 mV with respect to the SCE.

The optical property analysis revealed that the energy band gap of the glass/FTO/CBD-CdS and glass/FTO/CBD-CdS/ED-CdTe declined from 2.39 eV to 2.37 eV and their optical transmittance is over 80% in the wavelength ranges of 520-900 nm and 535-900 nm, respectively, in the devices. Therefore, there is no adverse effect of the ED-CdTe nucleation layer on light absorption by the window layer. The miniature shrinkage of the band gap might arise due to Te diffusion into the CdS layer. The SEM cross-sectional analysis uncovered that the thickness of the CBD-CdS/ED-CdTe bilayer was ~102 nm, and further, there is no distinguishable boundary between the ED-CdTe layer and CBD-CdS layer. No drastic change in surface roughness was detected between CBD-CdS/ED-CdTe and CBD-CdS. The SEM and AFM imaging further evidenced the improved uniformity of the surface layer upon deposition of the nucleation layer. Hence, the well packed ultra-thin ED-CdTe layer developed on glass/FTO/CBD-CdS substrate facilitates the growth of the CdTe absorber layer while minimizing the possible degradation or contamination of the CdS layer underneath upon exposure to high-temperature deposition by the close-spaced sublimation of CdTe.

Keywords: CdS/CdTe solar cell, Chemical bath deposition, Electrodeposition, Nucleation layer, Surface roughness.

¹ Department of Chemistry, Faculty of Science, University of Kelaniya, Sri Lanka

² Department of Physics, Faculty of Science, University of Jaffna, Sri Lanka

*sujewa@kln.ac.lk

Tuning the carboxylic groups and increasing the number of defects in graphene oxide nano sheets by changing the oxidation duration of modified Hummers method

Premadasa P. M.¹, Panamaldeniya S. A., Munasinghe M. A. H. M., Gunawardhana N.

Graphene Oxide (GO) is a 2-D monolayer/ few stacked layers material synthesized from graphite by introducing oxygen-containing functional groups (carboxylic, hydroxyl, and epoxy) to the graphene sheet. GO has both SP₂ and SP₃ hybridized carbon atoms, which are decorated by oxygen-containing functional groups. GO is extensively investigated in the translational research rather than fundamental research due to the broad range of applications in the synthesis of energy storage devices as fuel cells. The Modified Hummers method is the most frequently used method for the synthesis of GO. In this work, we have used the oxidation duration of the modified Hummers' method to tune the carboxylic groups that are attached to the GO sheets with a higher number of defects because the more COOH groups with higher number of defects could enhance the activity of the GO. Here, grinded vain graphite, KMnO₄ (an oxidizing agent), and H₂O₂ were used as basic precursors and three distinct GO materials were synthesized by varying the oxidation durations as 24, 48, and 72 hours for GO-1, GO-2, and GO-3. SEM, PXRD, FTIR, and RAMAN techniques were used to examine the qualitative and quantitative variations in COOH bonds in all three materials. According to the observed SEM images, the sheet morphology is visible in all three materials. But, the GO-3 sample exhibits a cloud-like structure with sheet morphology. It suggests that changing the oxidation time affected the number of defects in the materials. Next, the PXRD spectrums were observed to analyze interlayer spacing of GO sheets. Characteristic peaks of PXRD were obtained between 10° and 12°, but the d-spacing value increased with the oxidation duration of the materials. According to the observed FTIR spectrums, the peak intensities relevant to the carboxylic bonds at 1756cm⁻¹ enhanced with the oxidation duration while all the other peaks remained the same. Stronger vibration relevant to the COOH indicates the production of COOH bonds and GO-3 contains more COOH bonds rather than other two materials. The Raman analysis shows that the intensity of the G and D peaks has grown with the length of oxidation. With the rise in oxidation duration, the FWHM (full width half maximum) of band G, which indicates the presence of SP₃ bonding in the materials have also increased. Similarly, the oxidation duration affected the nature of the D band which confirmed the increment of number of defects with oxidation duration. In conclusion, the oxidation duration of the modified Hummers' method directly influences the formation of COOH bonds, and the number of COOH bonds increase with oxidation duration.

Keywords: Graphene oxide, Carboxylic tuning, Modified Hummers method, Defects rich GO

¹ pasangim21@gmail.com, Postgraduate Institute of Science, University of Peradeniya, Sri Lanka

An investigation on the sensory quality parameters of cookies incorporated with coconut testa flour

Kumuduni L. D. S.¹, Majeed U. L. A.^{1*}, Asmath A. M. M.¹, Rihan M. H.¹

Coconut testa is an underutilized by-product generated from coconut industries. It has a potential nutritional value and various health benefits due to the presence of functional and nutraceutical compounds in it. However, coconut testa is underutilized as animal feed or wasted with no added value. Therefore, the researchers focus on how it could be incorporated into food preparations that would benefit the wider society. Hence, this study focused on developing a coconut testa-based flour and studying the possibility of using it as a food ingredient, particularly for the bakery industry. A good quality coconut testa was selected and sliced into small pieces. The slices were then dehydrated for 25 minutes at 160°C and ground into a fine powder. The quality of the cookies developed from the blends of wheat flour: coconut testa flour at five different ratios such as 100:0, 75:25, 65:35, 55:45, and 45:55 % respectively, were investigated to evaluate the sensory properties of cookies including the characteristics such as texture, color, odor, appearance, taste, mouthfeel, and overall acceptability. The sensory evaluation was conducted with 60 untrained panelists who scored against various quality attributes on a 7-point Hedonic scale to determine consumer preference. The data generated were statistically analyzed with SPSS (version 25). The results obtained revealed that a significant difference ($p < 0.05$) was observed among different treatments in terms of all sensory quality parameters except odor. Score values for the color of cookies tended to increase due to brown color development caused by higher amounts of coconut testa flour. According to the panelists, a slightly bitter taste and undesirable mouthfeel were noticed in cookie samples exceeding 35% coconut testa flour level, which might be the cause of the lower acceptance of cookies incorporated with more than 35 % coconut testa flour. According to the findings of this investigation, replacing coconut testa flour up to a 35 % level might result in palatable cookies. However, higher preferences were given by the panelists to the cookie treated with 65:35 percent wheat: coconut testa flour. Therefore, underutilized coconut testa could be utilized for the development of bakery products with lower gluten content.

Keywords: Coconut testa, Cookies, Sensory, Bakery products

¹ University of South Eastern, Sri Lanka

* ulmajeed@seu.ac.lk

***In silico* study of physicochemical, pharmacokinetic, toxicity, metabolism and molecular docking of aristolactam E, a constituent of *Aristolochia elegans* Mast**

Wadanambi P. M.^{1*}, Seneviratne K. N.¹, Jayathilaka N.¹

Aristolochia elegans Mast, also known as Calico flower, is an ornamental plant found around the world including Asia. In traditional medicine, the plant has been used to treat a variety of disorders by employing its broad spectrum of pharmacological properties such as antibacterial, antitumoral, antidiarrheal, anti-snake venom, and anti-scorpion venom. It is also rich in aristolactam alkaloids, which have a variety of biological effects including anti-inflammatory, antibacterial, and anticancer activities. Aristolactam E (AE) is one of the less studied aristolactam alkaloids found in *Aristolochia elegans* Mast. Therefore, this computational study was designed to investigate (a) physicochemical properties and drug likeness, (b) pharmacokinetic and toxicity, (c) mode of antibacterial, anticancer and anti-inflammatory action, (d) sites of metabolism mediated by cytochrome P450 (CYP) 3A4 isoform and (e) probable metabolites of AE compound. The physicochemical attributes and drug likeness were assessed using molinspiration server. SwissADME, LASAR, and Pred-hERG 4.2 servers were used to estimate pharmacokinetic and toxicological characteristics. Molecular docking was performed using AutoDock 4.2 software to determine the binding affinity and molecular interactions of AE with protein targets namely, dihydropteroate synthase (DHPS), dihydroneopterin aldolase (DHNA), phospholipase A2 (PLA2) and tankyrase 2 (TNK2). SOMP, SMARTcyp, and RS-WebPredictor webservers were used to predict the sites of AE metabolism mediated by the CYP 3A4 isoform. Furthermore, the BioTransformer and GLORYx online tools were used to forecast the potential AE metabolites. AE demonstrated favorable physicochemical qualities and met the requirements for oral bioavailability and druggability by following both Lipinski's rule of five and the Veber rule. It also showed a high rate of human intestinal absorption and no blood-brain barrier permeability. Furthermore, the toxicity predictions revealed that AE was a mutagenic chemical, but it was not carcinogenic or cardiotoxic in the mouse model. The AE showed binding affinity of -5.45 kcal/mol, -8.79 kcal/mol, -7.32 kcal/mol, -8.30 kcal/mol and -8.41 kcal/mol with DHPS, DHNA, PLA2, TNK2 (nicotinamide binding site) and TNK2 (adenosine binding site) respectively. The AE exhibited a stronger binding affinity than the control compounds of DHNA and PLA2 while showing close binding affinity to the control of TNK2 (nicotinamide binding site). The overall evaluation identified two sites of metabolism of AE based on a consensus of different metabolism site predictions by CYP3A4 using SOMP, SMARTcyp and RS-WebPredictor webservers. Two probable metabolites of AE were proposed based on the consensus of the results of BioTransformer and GLORYx web tools. This computational analysis can aid in the development of AE derivatives with improved pharmacokinetic and toxicological profiles, hence accelerating drug discovery against microbial infections and inflammation.

Keywords: *Aristolochia elegans* Mast, Aristolactam E, Molecular docking, Metabolism, Toxicity

¹ Department of Chemistry, Faculty of Science, University of Kelaniya, Sri Lanka

* pwadanambi@gmail.com

Distribution of leishmaniasis cases and some demographic characters of patients recorded in the Medirigiriya medical officer of health (MOH) area, Polonnaruwa district of Sri Lanka

**Karunarathna D. M. N. P.^{1*}, Udayanga N. W. B. A. L., Ranathunge R. M. T. B.,
Kumarawansa W. K. W. S., Ganehiarachchi G. A. S. M.**

Leishmaniasis has been recognized as one of the major challenges to the health sector of many countries. In the Sri Lankan context also, leishmaniasis infections are increasing within the past few years. Evaluation of the spatio-temporal trends in leishmaniasis incidence strongly facilitates the management of leishmaniasis. Therefore, the current study was conducted to identify recent spatial and temporal trends in leishmaniasis distribution, while assessing the characteristics of susceptible population to leishmaniasis infection in the Medirigiriya Medical Officers of Health (MOH) area in the District of Polonnaruwa, which reported the highest number of Leishmaniasis cases over the period from 2015 to 2022. Monthly records of reported leishmaniasis cases in Medirigiriya MOH area were obtained at monthly intervals from Epidemiology Unit, Sri Lanka from January, 2018 to June, 2022. Spatial maps of the recorded leishmaniasis case distribution in each Public Health Inspector (PHI) area were developed using ArcGIS (version 10.8). The paired-Chi square was used to investigate the impact of gender and age on the infection. The Medirigiriya MOH area had reported a total of 418 cases within the study period. Among the five PHI areas, Medirigiriya (34.7%) and Diulankadawala (33.8%) PHI areas reported the highest incidence of leishmaniasis cases, emerging as the high-risk areas. Meanwhile, Ambagaswewa PHI area denoted the lowest susceptibility (7.6%). As suggested by the results of the paired-Chi square test, emergence of leishmaniasis was characterized with significant spatial and temporal trends ($P < 0.05$). The Percentage Infected Male: Female Ratio (PIMFR) suggested that the, males had a relatively high susceptibility for leishmaniasis infection than females, with an average PIMFER of 62.4:37.6. Significant shifts in the age of leishmaniasis patients were identified throughout the study period ($P < 0.05$). Population belonging to the age group of 40 to 60 years (44%) and 21 to 40 years (25.2%) were identified as the most vulnerable age group for the incidence of leishmaniasis. On the contrary, age groups of > 60 years reported the lowest vulnerability (9.2%) for leishmaniasis infection. The identification of the potential high risk PHI areas with high susceptibility to leishmaniasis, along with the vulnerable age groups in the community would assist the relevant vector controlling agencies to concentrate their efforts, ensuring the effective controlling of leishmaniasis outbreak occurrence within the Medirigiriya MOH.

Keywords: Leishmaniasis, Sandfly, Medirigiriya, Polonnaruwa, Sri Lanka

¹ Regional Director of Health Services Office, Polonnaruwa, Ministry of Health, Sri Lanka

* nadeeshaprasadini123@gmail.com

Metagenomic analysis of the effect of coconut milk on the colon microbiota

Ambanpola N.^{1*}, Anjali N. V. P.¹, Manilgama T.¹, Gunawardane M.¹, Seneviratne K. N.¹, Jayathilaka N.¹

The main source of fat in the diet affects the gut microbiome composition. Coconut milk (CM) has a high percentage of medium chain fatty acids (MCFA). A portion of MCFA reaches the colon and is fermented by the microbiota. This study was conducted with Wistar rats to study the effect of CM on colonic microbial diversity. Twelve-week-old female Wistar rats were randomly assigned to two experimental groups (12 rats/group). Ad libitum access to water and food was provided throughout the study. The control group was fed with a WHO-recommended diet containing 4.2 % total fat; of that 3% fat from soybean oil (SOD). The other group was fed a diet in which the fat component was replaced with CM (CMD). After 28 days, six rats from each group were fasted for 10–12 h and treated with ethanol (20%, 6 g/kg body weight) by oral gavage (SODE and CMDE). Mean \pm standard deviation (SD) feed Intakes were 900.50 \pm 4.93 g, 899.50 \pm 9.31 g, 818.00 \pm 6.57 g, 820.00 \pm 6.57 g and body weight gains were 52.83 \pm 1.83 g, 52.33 \pm 1.75 g, 45.50 \pm 2.43 g, 47.33 \pm 2.34 g in CMD, CMDE, SOD and SODE groups respectively. Feed conversion rates were approximately equal in the four groups (average 0.0580 \pm 0.002). At the end of the feeding experiments, animals were subjected to barbiturate euthanasia and a transverse abdominal incision was made. The cecal wash samples with phosphate-buffered saline (pH 7.4) were stored at -80 °C. All experimental procedures were approved by the Ethics Review Committee, University of Kelaniya. Microbial DNA was isolated from cecal wash samples using DNeasy blood and tissue kit (Qiagen). The 16S rRNA gene libraries were prepared and sequenced according to the protocols recommended by Ion Torrent (Ion GeneStudio S5 prime system, Thermo Fisher Scientific). Trimmed sequences were clustered into operational taxonomic units (OTUs) with a hierarchical cutoff of 97.0% similarity using Ion Reporter v5.16. Taxonomic annotation was conducted against Curated MicroSEQ 16S Reference Library v2013.1 and Curated Greengenes v13.5 databases. Alpha-diversity and beta-diversity analyzes were performed using the QIIME2 platform. Bacteroidetes and Firmicutes phyla represent 90% of the cecal bacterial community across dietary groups. Other microbial phyla in the cecal wash samples were Actinobacteria, Proteobacteria, and Tenericutes. The cecal microbiota of CMD-fed rats was characterized by a significant increase ($P < 0.05$) in the relative abundance of Desulfovibrionaceae, Eubacteriaceae, Erysipelotrichaceae, Lachnospiraceae Porphyromonadaceae, Ruminococcaceae bacterial families, and a decreased relative abundance of Bacteroidaceae, Clostridiaceae and Lactobacillaceae compared to the control diet. Studies have shown that alcohol promotes both dysbiosis and bacterial overgrowth. According to the two factor ANOVA, there was a significant difference ($P < 0.05$) in colonic-microbiota between the four groups. Family level rarefaction plots were varied CMD>CMDE>SOD>SODE and CMD>SODE>CMDE>SOD according to Chao1 index and Simpson's indexes respectively. Principle component analysis revealed four distinct clusters, suggesting that both diet and alcohol-induced oxidative stress affected gut microbiota. The elevated bacterial families have an impact on microbial-mediated saccharolytic functions, lipophilic functions, vitamin synthesis, and protection against intestinal infections. Thus, the intestinal microbiota in Wistar rats varies significantly with dietary fat source and oxidative stress conditions.

Keywords: Gut Microbiome, 16S rRNA, Coconut milk, Wistar rats, Medium-chain fatty acids

¹ University of Kelaniya, Sri Lanka

* nimrothambanpola@gmail.com

Application of rolling circle amplification (RCA) to detect direct amplification of dengue virus in patient serum samples.

Manilgama T.¹, Seneviratne K. N.¹ Jayathilaka N.^{1*}

Rolling Circle Amplification (RCA) is an isothermal amplification process that can be utilized for rapid amplification of target nucleic acids. In contrast to PCR, which uses thermocycling to mediate denaturation, annealing, and subsequent extension, RCA can be performed at a single reaction temperature making RCA an attractive solution for disease diagnosis based on amplification of pathogen nucleic acids at resource limited settings. In addition, PCR-based detection of pathogenic RNA involves the additional steps required to make complementary DNA copies of the target for amplification. Dengue is a mosquito vector borne viral RNA infection that largely affects urban and semi-urban, sub-tropical and tropical areas. While majority of dengue fever patients recover with careful hospital monitoring some patients may develop severe complications that result in mortality. Therefore, early diagnosis is critical for screening the patients that require hospital management and to prevent exceeding hospital capacity during a dengue outbreak. We developed a direct RCA of dengue virus RNA in serum samples from dengue virus positive patients using Phi 29 DNA Polymerase for the disease diagnosis at resource limited settings. Serum samples were collected from patients suffering from dengue virus infection based on a positive NS 1 antigen test within four days from fever onset with informed consent (n=3). Serum samples collected from healthy individuals were used as the controls (n=3). Multiple Displacement Amplification (MDA) was used to increase the amplification efficiency. Positive control reactions were carried out using a circularized 66 bp linear 5' phosphorylated probe that contained a complementary sequence to all four dengue serotypes and a forward primer against the conserved target region on the probe at 30 °C overnight. The product formation was confirmed by gel electrophoresis following restriction enzyme digestion of the RCA/MDA products with EcoRI. The RCA/MDA products were quantified using a ssDNA dye. Direct isothermal amplification of dengue virus from serum samples collected from dengue infected subjects confirmed that RCA/MDA reaction specifically amplifies dengue virus in patients while no amplification was detected for the serum samples collected from healthy volunteers. Since RCA/MDA can be used for direct gene expression analysis of mRNA and micro RNA in resource limited settings, this novel method can be used for simultaneous disease diagnosis and early prognosis of severe dengue based on differential expression in resource limited settings.

Keywords: Severe Dengue, Phi29 enzyme, Rolling Circle Amplification, Multiple Displacement Amplification and Serum.

¹ Department of Chemistry, Faculty of Science, University of Kelaniya, Sri Lanka

* njayathi@kln.ac.lk

Effect of the wet extraction methods on the phenolic profile of coconut oil

Anjali N. V. P.¹, Algama C. H.¹, Seneviratne K. P.¹, Jayathilaka N.¹, Seneviratne K. N.^{1*},
Sakalasuriya D. D.¹, Silva C. D.

There are multiple methods for producing virgin coconut oil, which can broadly be divided into wet and dry processes. In the wet methods, coconut oil is directly extracted from the coconut milk, an aqueous emulsion is prepared using freshly grated coconut kernel. The method used to extract oil can affect the quality parameters and the phenolic profile of each coconut oil. Therefore, the phenolic profile, and the antioxidant capacity of coconut oil produced using four wet extraction methods, namely, boiling method (BM), fermentation method (FM), chilling and thawing method (CTM) and centrifugation method (CM) were quantified using previously reported methods. The shelf life of each oil sample at 28 °C was analyzed based on the induction time of each oil sample using a Rancimat apparatus. Phenolic profiles and unsaponifiable matter were analyzed qualitatively and quantitatively using HPLC. Shelf life at 28 °C (2.9 ± 0.0 years), α -tocopherol (78.9 ± 0.4 mg/Kg), total phenolic content (660 ± 1 gallic acid equivalent mg/oil Kg) and antioxidant activity ($19.4\pm 1.0\%$) are significantly ($P<0.05$) higher in the oil prepared by BM compared to the other wet extraction methods. The phenolic profile of CM and CTM included *p*-hydroxybenzoic acid, epigallocatechin gallate (EGCG), and epicatechin. The phenolic profile of coconut oil prepared by FM included gallic acid, *p*-hydroxybenzoic acid, EGCG, epicatechin, and epigallocatechin (EGC). In addition to the *p*-hydroxybenzoic acid and gallic acid, galocatechin gallate (GCG), and catechin were found in significantly ($P<0.05$) higher amounts in coconut oil extracted using BM as a result of epimerization of EGCG and epicatechin to GCG and catechin under the heating conditions used in the BM. Hydrolysis of EGCG was found to be responsible for the observed low levels of EGCG (0.01 ± 0.00 mg/oil Kg) and the presence of gallic acid and EGC in the coconut oil prepared by FM compared to the other two cold extraction methods (CTM, CM). Therefore, the extraction method has a significant impact on the phenolic profile of coconut oil.

Keywords: Coconut oil, Wet extraction, Phenolic profile, Epimerization, Hydrolysis

¹ University of Kelaniya, Sri Lanka

* kapilas@kln.ac.lk

Effect of coconut milk on intestinal barrier function and management of oxidative stress

Ambanpola N.^{1*}, Anjali N. V. P.¹, Manilgama T.¹, Gunawardane M.¹, Seneviratne K. N.¹, Jayathilaka N.¹

Coconut milk (CM) is a major source of dietary fat in a Sri Lankan meal. It is rich in saturated, medium-chain fatty acids (MCFA) and various polyphenols. Some of the ingested fats and polyphenols are not absorbed in the small intestine and reach the colon. This study assessed the formation of metabolic products from CM and the influence of CM on intestinal barrier function. Twelve-week-old female Wistar rats were housed at $25 \pm 1^\circ\text{C}$ with a 12 h light and dark cycle. Rats were randomly assigned to two experimental groups (12 rats/ group). Ad libitum access to water and a diet containing 4.2 % total fat; from that 3% fat by means of soybean oil (SOD) control or CM (CMD) was provided for four weeks. Six rats from each group fasted for 10–12 h and were treated with ethanol (20%, 6 g/kg body weight) by oral gavage (SODM and CMDE groups were obtained). Blood (1 mL) was then drawn from the tail vein. Plasma antioxidant capacity, lipid peroxidation, and protein carbonyl content were determined by 2,2-diphenyl-1-picryl-hydrazyl (DPPH) assay, ferric reducing antioxidant power (FRAP) assay, protein carbonyl assay, and thiobarbituric acid reactive substances (TBARS) assay according to previously reported methods. At the end of the feeding experiments, animals were subjected to barbiturate euthanasia and a transverse abdominal incision was made. The cecal wash samples with phosphate-buffered saline (pH 7.4) were stored at -80°C . Liver and brain samples were also harvested. All experimental procedures were approved by the Ethics Review Committee, University of Kelaniya. Short-chain fatty acids (SCFAs) in the cecal wash, plasma, liver, and brain samples were quantified by Gas chromatography. SCFA levels were determined by the standard curves of each SCFA. Shapiro-Wilk normality test ($P < 0.05$) and t-test was used for the statistical comparison. Acetate, propionate, and butyrate concentrations were $802.9 \pm 0.4 \mu\text{g/mL}$, $156.3 \pm 2.1 \mu\text{g/mL}$, $20.5 \pm 0.4 \mu\text{g/mL}$ and $802.8 \pm 0.4 \mu\text{g/mL}$, $153.5 \pm 1.7 \mu\text{g/mL}$, $19.9 \pm 0. \mu\text{g/mL}$ in CMD and SOD cecal wash samples respectively. Acetate, propionate, and butyrate concentrations were $236.2 \pm 0.1 \mu\text{g/mL}$, $16.2 \pm 0.2 \mu\text{g/mL}$, $1.3 \pm 0.0 \mu\text{g/mL}$ and $226.3 \pm 1.4 \mu\text{g/mL}$, $14.4 \pm 0.2 \mu\text{g/mL}$, $1.2 \pm 0.0 \mu\text{g/mL}$ in CMD and SOD plasma samples respectively. There was a significant ($P < 0.05$) difference between plasma acetate and propionate levels in CMD compared to SOD. SCFAs were not detected in liver and brain samples. Saccharolytic microbes ferment oligo- and polysaccharides and produce SCFAs. Following their production SCFAs are rapidly absorbed by colonic cells and those not metabolized by colonic cells pass into the liver. Thus, only a small amount of the SCFAs reach systemic circulation and other tissues. Alcohol causes oxidative stress by releasing reactive oxygen species (ROS) during alcohol metabolism. Polyphenols serve as exogenous antioxidants, and they scavenge free radicals to control ROS. According to the four assays, there were no significant differences in the antioxidant capacity between the four groups suggesting no antioxidant effect of coconut milk over soy oil control. Thus, CM has a significant ($P < 0.05$) impact on SCFAs passing through the intestinal barrier but no effect on the management of oxidative stress than soy oil.

Keywords: Coconut milk, Wistar rats, Medium-chain fatty acids, Intestinal barrier, Oxidative stress

¹ University of Kelaniya, Sri Lanka

* nimrothambanpola@gmail.com

Addition of two *Trichoderma* species with organic fertilizer paste - A boon for crop yield of *Abelmoschus esculentus* L. cv. MI 5

Kalpani N. N.¹, Kannangara B. T. S. D. P.¹, Ratnayake R. M. C. S.^{1*}

Sustainable agriculture is a farming technique that minimizes environmental impacts while providing a tenable yield. The use of organic amendments as an alternative to inorganic treatments has more significant potential to establish a self-sustaining, less expensive, and environmentally friendly agricultural system. The amalgamation of organic fertilizer with bio-controlling microorganisms is more beneficial than individual application in cropping land to enhance crop productivity. The present study was aimed to examine the influence of an organic fertilizer paste enriched with *Trichoderma* spp. to enhance the growth performances and yield of *Abelmoschus esculentus* L. cv. MI 5. The organic fertilizer paste was prepared by aerobic digestion of air-dried and powdered immature twigs of the following plants; *Annona glabra*, *Clidemia hirta*, *Chromolaena odorata*, and *Pongamia pinnata* (2.0 kg each) in distilled water (42.0 L) for a month. Bio-controlling agents *Trichoderma harzianum* (KT852821.1) and *Trichoderma virens* (KP985643.1) were formulated in solid carrier material (compost, straw, clay, and cow urine; 2:1:1:1) separately. The pot trial consisted of six treatments of liquid organic fertilizer enriched with *Trichoderma* spp. (T10H, T10V, T20H, T20V, T25H, and T25V, where 10, 20, and 25 denote 10%, 20%, and 25% of *C. odorata*, *A. glabra*, *C. hirta*, and *P. pinnata* extract combined with H as *T. harzianum* and V as *T. virens*) with 15 replicates in a completely randomized block design. One-week-old *A. esculentus* L. cv. MI 5 seedlings were soil treated for 3 months (1st week - 5 mL, 2nd week - 10 mL, 3rd week - 15 mL, 4th week - 20 mL, and 100 mL). The positive and negative controls were commercial fertilizer (Maxicrop) and tap water, respectively. Shoot growth performances, root growth performances, average fresh weights, and average dry weights, and the amount of harvest of *A. esculentus* L. cv. MI 5 were measured after 3 months of the plantation. One-way ANOVA statistical method, along with Tukey's multiple comparison tests were used to identify the significant differences ($P \leq 0.05$) in growth parameters among treatments using MINITAB (Version 17). T10H treatment (10 % diluted *C. odorata*, *A. glabra*, *C. hirta*, and *P. pinnata* extract only incorporated with *T. harzianum*) recorded significantly ($P \leq 0.05$), the highest average plant shoot height (163.6 ± 5.40 cm), number of leaves (39 ± 2), stem circumference (5 ± 0.19 cm), average leaf area (309.56 ± 1.2 cm²), root length (38 ± 2.20 cm), the girth of the root (5.24 ± 0.32 cm), number of lateral roots (59 ± 2.08), fresh weight of the entire plant (146.13 ± 16.79 g/plant), fresh weight of the root (35.53 ± 5.82 g/plant), average dry weight of the whole plant (17.61 ± 1.79 g/plant), dry weight of the shoot biomass (13.1 ± 1.42 g/plant), dry weight of the root biomass (4.19 ± 0.09 g/plant), the average number of pods per plant (30 ± 0.24), and average fresh weight of pods (39.83 ± 2.14 g). Therefore, T10H treatment can be successfully used as the best organic fertilizer paste enriched with *T. harzianum* to enhance the growth and yield of *Abelmoschus esculentus* L. cv. MI 5.

Key words: *Abelmoschus esculentus*, Growth performance, Organic fertilizer paste, *Trichoderma* spp. Crop yield

¹ Department of Plant and Molecular Biology, Faculty of Science, University of Kelaniya, Kelaniya, Sri Lanka
* ratna@kln.ac.lk

Author Index

Abeysekera R.....	3	Ganehiarachchi G. A. S. M.....	111
Abeywardana P. C.....	1	Gayathri Y.K. K. M. K.....	96
Abeywickrama L. M.....	7	Gunasekara H. P. P.T.....	8
Adikaram A. M. N. M.....	97	Gunasekara T. D. K. S. C.....	23
Algama C. H.....	114	Gunathilaka N.....	16, 17
Amarakoon A.....	50	Gunawardane M.....	112, 115
Amarasinghe H.....	52	Gunawardene Y. I. N. S.....	24, 25
Amarasinghe L. D.....	103	Gunawardhana N.....	108
Amaraweera T. H. N. G.....	89, 94, 98	Hapugoda M. D.....	24, 25
Ambanpola N.....	112, 115	Herath C.....	23
Anjali N. V. P.....	112, 114, 115	Iddamalgoda H.....	28
Arambepola N.....	11	Jayarathna D.....	52
Asmath A. M. M.....	109	Jayasinghe - Mudalige U. K.....	1
Attanayake M. K. D. K.....	22	Jayasinghe D. G. T. A.....	49
Bandara S.....	16	Jayasinghe S.....	23
Chalker V. J.....	31	Jayasundara D. D. M.....	100
Chamikara V.....	95	Jayasundara N.....	23
Chandana E. P. S.....	23	Jayathilaka K. G. R. H.....	48
Chandrasekara E. C. M.....	39	Jayathilaka N.....	95, 101, 102, 104, 110, 112, 113, 114, 115
Chathurika H. L. D. J.....	3	Jayawardana G. P. C.....	28
Deshan R. S.....	37	Kalpani N. N.....	116
Dissanayaka D. M. P. V.....	100	Kandiah M.....	86, 88, 90, 91
Dissanayake A. U.....	43	Kannangara B. T. S. D. P.....	116
Dissanayake D. M. A. B.....	21	Karunarathna D. M. N. P.....	111
Dissanayake D. M. P. M.....	44	Karunasekara H. C. I.....	28
Ediriweera D.....	9	Kodikara K. G.....	13, 14, 15
Fernando I. D. K. L.....	76	Kumara J. C. R.....	36
Fernando L.....	24	Kumarasingha A. R.....	93
Fernando W. P. N.....	30	Kumarawansa W. K.W.S.....	111
Fernando W. T. R. S.....	94	Kumari M. K. J. K.....	87
Fernando. F.....	85	Kumuduni L. D. S.....	109
Gajanayake G. K. U. P.....	107	Leeniyagoda S. O.....	41
Gamage C.....	52		

Liyanage H. I. D.	106	Perera W. P. R. T.	87, 93, 99
Liyanage J. A.	87, 93, 99	Perera W. U. P.	83
Liyanage S. R.	10	Pitawala H. M. T. G. A.	97
Madhubhashani N. H. A. C.	8	Podduwage D. R.	75
Madhusankha A. T.	28	Pothuhera A.	92
Madugalla T. B. N. S.	97	Premadasa P. M.	108
Madugalle S.	20	Premarathna B. A. H. R.	14, 15
Majeed U. L. A.	109	Premarathnac B. A. H. R.	13
Manamperi A.	24	Premarathne W. G. I. D.	3
Manilgama T.	112, 113, 115	Premaratne W. A. P. J.	87, 99
Mannapperuma U.	102	Premathilaka H. I.	35
Marwah R.	71	Premawardhena A. P.	32
Mithulan R.	5	Ramanayake S. S.	71
Mudage J.	40	Ranathunge R. M. T. B.	111
Mudalige. H.	85	Ranathunge T.	25
Munasinghe M. A. H. C.	100	Ranaweea R. M. L. H.	98
Munasinghe M. A. H. M.	108	Randiwela R. M. D. S.	73
Muthukumarana C.	9	Ranthilini P. V. S. S.	45
Nambuwasam S. G.	10	Rathnayake A.	86
Napagoda N. A. D. N.	96	Ratnayake C. S.	27
Narangoda P.	36	Ratnayake I.	38
Naranpanawa H. M. H. D. K.	89	Ratnayake R. M. C. S.	116
Nugawela M.	100	Remoshan V.	68
Panamaldeniya S. A.	108	Rihan M. H.	109
Pathum A.	92	Rishan R. M.	8
Perera A.	16	Rizwan M. S. M.	54
Perera C. T. S. S.	74	Rodrigo W. W. P.	17
Perera D. S.	103	Rupasinghe T.	9
Perera E. H. L.	24, 25	Safinaz Z. M. F. Z.	30
Perera H. A. R. P.	20, 22	Sakalasuriya D. D.	114
Perera H. L.	32	Samarakoon Y. M. I. B.	98
Perera L. A. S.	3	Samarasinha S.	88
Perera P.	26, 29, 31	Sandaruwan G. B. C.	97
Perera P. L. R. A.	87, 93, 99	Sandika A. L.	7
Perera S.	90	Sanjeevani M. D. S. M.	69
Perera S.M.	95	Senadheera V.	9

Senevirathna W. N. S.	47	Viswakula S.	24
Seneviratne H. M. T. W.....	13, 14, 15	Wadanambi P. M.	95, 101, 102, 104, 110
Seneviratne K. N.95, 101, 104, 110, 112, 113, 114, 115		Wakkumbura H. P.....	18, 19
Seneviratne K. P.	114	Warnasooriya W. W. S. T.....	76
Serasinghe H. P.	70	Wasana P.P.	8
Shahna S.	91	Wathsala H. M. S.	45
Silva A. M. H.....	106	Wickrama S. M.....	34
Silva C. D.....	114	Wickramarachchi M.....	53
Silva D. S. M.	105	Wickramarachchi S.	103
Silva D. S. M. D.	107	Wickramasinghe K.	16
Silva P. M. C. S. D.....	23	Wickramasinghe M. G. C. N.	32
Silva R. C. L. D.	105	Wijayasinghe A.	94
Silva R. D.....	2	Wijayasinghe H. W. M. A. C.....	89, 98
Siribaddana S.....	23	Wijayasinghe W. A. P. N.....	30
Siriwardana S. A. S. R.....	30	Wijebandara N. R. Y.	21
Siriwardana S. R.	27	Wijegunawardena A.	17
Siriwardena B. P.....	7	Wijerathna T.....	16, 17
Sivaprasad S.....	100	Wijesinghe H.....	72
Subasinghe U.	24	Wijesinghe P.	21
Subhashi S.....	2	Wijesooriya L. I.	26, 27, 28, 29, 31
Sumanasena S. P.....	30	Wimalasiri U.	17
Sunil-Chandra N. P.	26, 29, 31	Wimalasoma S. M. T. D.....	89
Tennakone T. M. M. K.....	42	Yatigammana M. R. K. N.	10
Thanihaichelvan M.....	107	අනපත්තු ඒ. එම්. එස්. ජේ. බී.	64
Thanujan T.	8	අමරතුංග කේ. එම්. ජී.....	81
Tharangani W. A. S.	18, 19, 20, 22	අමරසිංහ එස්.....	80
Tharsika K.....	4	උඩගලදෙණියේ ධම්මවිමල හිමි.....	59
Thebuwana K. L.....	46	කීර්ති ජේ. කේ. පී. යූ.....	80
Thennakoon B. N.....	51	කුමාර එන්. ඩී. ජී. ඒ. එ. එච්.....	80
Thilakarathner S.	32	කෝදාගොඩ කේ. ඒ. ඒ. අයි.	63
Udagedara D. T.....	97	ගුණසිංහ එච්.....	79
Udawattaa M. M.....	105	ජයසිංහ එස්. ජේ. පී. පී.....	60
Udayanga N. W. B. A. L.....	25, 111	දිල්හානි ඒ.	77
Vidanapathirana N. P.	7	ධම්මි සී.පී.....	58
Vipulaguna D. V.	30	නිලන්ත ඒ. එල්.....	60
		පනාවල ධම්මධජ හිමි.....	55, 65

පෙරේරා ඒ.....	78	රත්නපුර යූ. ජේ.....	67
බණ්ඩාර ටී. එම්. බී.....	61	රණවීර ආර්. එල්.....	57
බණ්ඩාර පී. ජී. සී. එම්. ටී.....	56	රණසිංහ ආර්. එම්. ටී. බී.....	66
මාධව ජේ. ඒ. ටී.....	82	විජේසුන්දර ඩබ්ලිව්. එල්. එස්. එස්.....	62
හෙට්ටිආරච්චි පී. සී.....	81		



UNIVERSITY OF
KELANIYA

Faculty of
Graduate Studies