Proceedings of

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University of Ruhuna

"Developing Academic Integrity and Literacy through Research"

October 02, 2020

Faculty of Allied Health Sciences, University of Ruhuna

Galle, Sri Lanka

RuFARS - 2020

"Developing Academic Integrity and Literacy Through Research"

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Foreword

The 3rd Research Symposium (RuFARS-2020) was organized by the Faculty of Allied Health Sciences, University of Ruhuna, Sri Lanka. The abstracts arisen from diverse disciplines of Allied Health Sciences have been peer reviewed prior to acceptance. The abstracts have been edited to maintain language accuracy and page limits. Responsibilities of the content text of the abstracts included in this publication remain with the respective authors. No part of this serial publication will be reported in any form.

When citing the abstracts published, the serial publication is to be referred to as 'Proceedings of the 3rd Research Symposium, Faculty of Allied Health Sciences, 2020, University of Ruhuna'.

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RuFARS-2020

Message from the Keynote Speaker
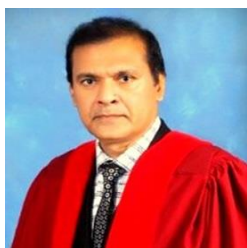
It gives immense pleasure for me to be involved as a keynote speaker of the third research symposium of the Faculty of Allied Health Sciences, University of Ruhuna. Though your faculty is still young, I feel that it is important to inculcate research culture among beginners in the allied health professions and share research evidence among the colleagues from the very beginning which would have an immense impact on the field of health research and that would ultimately facilitate all our visions to achieve excellence. We all are living in the information age, in a digital world with tremendous changes that are taking place in the health care sector that have significant impact on our health professions. Effective systems for education, research and regulation are vital for strengthening the contribution of health services to achieve better health care outcomes. So, I am delighted to see the organizing committee has selected a very important theme - **"Developing Academic Integrity and Literacy through Research"** This is timely, important and directly relevant to our academic community in order to enlighten the horizon of intellectual standards. It deals with the values, behavior and conduct of academics in all aspects of their practice including teaching, research and service. Most importantly, literacy outcomes can be visualized in terms of new knowledge positive attitudes, greater self-efficacy and favorable behavior changes within an individual. Therefore, I hope the evidence-based dialogues in this scientific forum related to above theme would give researchers and scientific community an excellent opportunity to share their reflections and thoughts about how young researchers achieve academic integrity and literacy through scientific research. I would like to extend my sincere thanks to the organizing committee for giving me this opportunity to share my experiences as an educator and a researcher.

I wish you all a very successful research symposium.

Dr. S.S.P. Warnakulasuriya
Dean
Faculty of Nursing
University of Colombo

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Message from the Vice Chancellor and the Chief Guest

As the Vice Chancellor of University of Ruhuna, it gives me immense pleasure to send this message to the **Research Symposium of the Faculty of Allied Health Sciences, University of Ruhuna (RuFARS-2020)**. Faculty of Allied Health Sciences is the youngest faculty of University of Ruhuna. It is functioning with the aim of producing good quality, technically competent health professionals to the country. Accordingly, the Faculty of Allied Health Sciences has a national responsibility to fulfil the increasingly demanded and highly trained healthcare professionals to cope with the trends in the modern healthcare system. Research in the fields of Allied Health Sciences can play an integral role in the delivery of precious health care. A safe, effective, efficient, accessible, timely and patient-centered healthcare system is an asset for any country. It is essential to examine and evaluate new and innovative approaches to develop a modern, ever improving national health care system. It is also important to embark on new models of service delivery to advance and extend the scope of practice. Research can help to develop professional esteem and credibility and ensure allied health professionals are at the same levels with their fellow health care practitioners. To align with that purposes, there is an emerging need for allied health professional to be trained in advance research capabilities.

In that context, the research capacity building among Allied Health undergraduates is very important. Accordingly, organizing annual research symposium could be identified as a great initiative taken by the Faculty of Allied Health Sciences. Research symposia provide opportunities for young researchers to improve their research abilities, communication skills and get exposed to peer reviews. Research activities have great potential to create graduates with enriched critical thinking and analytical skills. This symposium will be an excellent forum to share knowledge and findings of the researchers with their peers and healthcare practitioners.

The theme of RuFARS-2020 is "Developing Academic Integrity and Literacy through Research". Even though this theme has a significant and a timely importance, it is less addressed as a core concept in scientific fora. Being proficient in academic reading and writing which is called as "academic literacy" is key to the success of any researcher. Academically literate researcher always contributes to the ongoing academic discussions productively. On the other hand, academic integrity always ensures the originality, credibility and standard of the research works. The meticulous attention and concern over academic integrity and literacy is a very important concept among the global academia. Therefore, the timely initiative of the Faculty of Allied Health Sciences to address this unique theme through their most prestigious annual academic event should be greatly appreciated.

I would like to take this opportunity to thank the organizing committee lead by the Dean, Faculty of Allied Health Sciences and the Chairperson, RuFARS-2020. The great effort of the

organizing committee to organize this Research Symposium for the third consecutive year should be immensely appreciated. Organizing of such an event in every year is no easy task for the youngest faculty of the University of Ruhuna. The courage and commitment to achieve the milestones through overcoming all the challenges should be profoundly appreciated.

I whole heartedly wish the 3rd Research Symposium of the Faculty of Allied Health Sciences, University of Ruhuna, RuFARS-2020 a great success.

I look forward to witnessing an exciting and successful symposium.

Senior Professor T.S.D. Amarasena
Vice Chancellor
University of Ruhuna

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Message from the Dean, Faculty of Allied Health Sciences

I feel honored and privileged as the Dean, Faculty of Allied Health Sciences, University of Ruhuna to write this congratulatory message to the proceedings of the 3rd Annual Research Symposium of the Faculty of Allied Health Sciences, University of Ruhuna under the theme "Developing Academic Integrity and Literacy Through Research".

RuFARS is a multidisciplinary event covering all fields of Allied Health Sciences which provides an opportunity for researchers to share their research findings and innovative ideas with peers, practitioners, policymakers and implementers. This forum also provides an opportunity for budding researchers to get a feedback from eminent researchers in the field. The conference aims to connect a range of Allied Health professionals from both public and private sector to achieve better outcomes for health care consumers based on the current innovations in health care technology.

The symposium proceedings include findings of the 64 research projects. Over the last few years, undergraduate research work has immensely contributed to strength the research culture of the Faculty Allied Health Sciences. It is inspiring to notice that the majority of the publications in the proceedings of third annual research symposium have showcased the research potential and the talents of the graduating students. I am very happy to see that mandate of Allied Health professions to train and develop highly qualified, competent and confident Allied Health professionals to meet the nation's demand through the provision of academic and professional knowledge confirmed by the quality of proceedings reflecting high standard of the research.

My sincere gratitude goes to the Vice Chancellor of the University of Ruhuna for his unceasing moral support to organize this event. The symposium would not have been possible without the enthusiasm and hard work of a number of colleagues. I would like to express my appreciation and gratitude to Ms. Eranthi Weeratunga, Chairperson and all the committee members of the third Ruhuna University Faculty of Allied Health Sciences Research Symposium for their valuable contribution to make this event a success. The excellent contribution of the reviewers and the members of the editorial board is highly appreciated.

Finally, I take this opportunity to congratulate all the presenters and wish them all very best of luck.

Professor Imendra Kotapola
Dean
Faculty of Allied Health Sciences
University of Ruhuna

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Message from the Chairperson RuFARS-2020

I am pleased and feel honored to release this message to the proceedings of the 3rd Ruhuna Faculty of Allied Health Sciences Research Symposium; RuFARS-2020 as the chairperson of the organizing committee. It is my great pleasure and privilege to invite you to 3rd Annual Research Conference, Faculty of Allied Health Sciences (FAHS) as the youngest Faculty of the University of Ruhuna. FAHS, University of Ruhuna has been developed to create well qualified skillful Allied Healthcare professional to meet the current demand nationally and internationally.

The first research conference was held in 2018 after becoming the FAHS, the youngest Faculty in the University of Ruhuna. We have become fortunate to conduct the faculty research symposium this year as well making this event as a calendar event of our faculty which is the most inspiring and the elegant event. This year it is hosting by the Department of Nursing under the theme "Developing Academic Integrity and Literacy through Research".

Sri Lanka is progressing well towards the Millennium Development Goals related to health. Further improvement of the Allied Health field of the country may eventually improve the general health status and the quality of life of the people of the country and in turn will be helpful in improving the general indicators beyond the goals. Therefore, we have been engaged to produce competent professionals/graduates in the related disciplines of the Allied Health field. Currently, all undergraduates of three-degree programmes have the exposure of research which related to health sciences. This research symposium extends the opportunity to academics, students, scientists and researchers in the country to interchange their knowledge and capacities in different specialties in health sciences and further to create national and international cooperation among researches.

The success of any scientific sessions is the hard work and selfless contribution of the organizing committee leading to the endorsement by the participant at large. I am really content to lead success energetic and capable team. I wish to express my sincere gratitude and appreciation to Senior Professor Sujeewa Amarasena, the Founder Principal Coordinator of the AHS degree programme, Founder Dean of the FAHS and the Vice Chancellor of the University of Ruhuna, Professor E.P.S. Chandana, Deputy Vice Chancellor, University of Ruhuna and Professor Imendra Kotapola, Dean, FAHS for their valuable guidance, advice and immense support to make this event a success. I extend my heartfelt gratitude and appreciation to Dr. S.S.P. Waranakulasuriya, Dean, Faculty of Nursing, University of Colombo for enlightening our symposium, accepting our invitation to be the keynote speaker.

We received nearly 70 abstracts for presentations this year with the issues of COVID-19. Furthermore I would like to greatly appreciate the extensive support extended by the three Heads of the Departments, academic and non-academic staff members, Assistant Registrar, Assistant Bursar, Senior Assistant Librarian, Joint Secretaries, members of the advisory and editorial boards, the panel of reviewers and judges and chairpersons of the technical sessions, In-charge persons and members of all RuFARS-2020 sub committees and my dear students, for making this attempt a reality with many obstacles. I am thankful to all the sponsors of RuFARS-2020 for their financial assistance and to the Dean and the staff of the Faculty of Medicine for providing facilities to host this symposium. I am sure that this symposium will bring the lavish memories to all participants in this year to follow.

I wish RuFARS-2020 a great success and I wish you all a fruitful symposium.

Ms. S.M.E.B. Weeratunga
Chairperson, RuFARS-2020

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Reviews on Postgraduate Studies Completed by the Academic Staff Members of the Faculty of Allied Health Sciences

R 01

Vitamin D deficiency and its associated factors: A descriptive study among a selected group of premenopausal women in Sri Lanka

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Abstract

Background: Vitamin D (vit-D) plays a significant role in bone health, largely by regulation of calcium homeostasis in the body. Hypovitaminosis D is linked with a multitude of co-morbidities. Many nutritional and behavioural factors are associated with low vit-D levels.

Objectives: To assess the prevalence of vit-D deficiency and its associated factors in a sample of premenopausal women in Sri Lanka

Methods: Community dwelling healthy women (free of diseases and drugs including vitamins) between 20-40 years (n = 132) were selected from Matara and Kandy districts. Consumption of vit-D rich dairy and non-dairy foods and the duration of sun exposure were estimated. Serum vit-D level was measured. Vit-D reference values introduced by Lips *et al* were used to categorize subjects.

Results: Eight subjects (6.1%) were vit-D deficient while 68 (51.5%) had vit-D insufficiency. There was no difference in median vit-D levels according to age (20-30 vs 31-40 years). Vit-D was higher in women who had sun exposure >2 hours/day compared to women who had <2 hours/day. Vit-D positively associated with dairy (r = 0.189, *p* = 0.04) and non-dairy vit-D rich food intake (r = 0.263, *p* = 0.01).

Conclusions: Hypovitaminosis D is prevalent among community dwelling healthy middle-aged women in Sri Lanka. Interventions should be planned based on sun exposure and diet to overcome this prevalent problem.

Key Words: *Vitamin D, Hypovitaminosis, Sri Lankan premenopausal women, Sun light exposure, Dairy intake*

Background

Vitamin D is essential for the maintenance of calcium homeostasis and optimum skeletal health. In the body, vitamin D is available in two bioequivalent forms: D_2 (ergocalciferol) and D_3 (cholecalciferol). Vitamin D_2 is obtained from vegetables, mushrooms and oral supplements while vitamin D_3 is obtained mainly from skin exposure to ultraviolet B (UVB) radiation in sunlight and from oily fish, fortified foods and oral supplements in limited amounts. Vitamin D_3 is the circulating mode while vitamin D_2 is the active metabolite responsible for major biological actions. Recent studies have discovered the pleiotropic effects of vitamin D therapy especially on renal, cardiovascular, reproductive and immune systems in the body (Pittas and Dawson-Hughes, 2011; Talaei et al., 2013; Pérez-Hernández et al., 2016).

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Vitamin D deficiency (VDD) has become a major public health concern as it is prevalent in all age groups and ethnicities (Palacios and Gonzalez, 2015). Further, VDD is not uncommon in countries with sufficient UV-B light and among populations who consume vitamin D fortified food (Holick and Chen, 2008). According to Forrest and Stuhldreher (2011), VDD is found in 41.6% Caucasians and among them the highest rate is noted in those of Afro-Caribbean decent (82.1%), followed by Hispanics (69.2%).

Higher prevalence of VDD is found among both South and Southeast Asian populations despite sunlight throughout the year in some regions (Nimitphong and Holick, 2013; Akhtar, 2016; Lowe and Bhojani, 2017). Nearly 70% of Indian population is VDD or Vitamin D insufficient (VDI) despite high consumption of dairy products (Harinarayan et al., 2013). Certain religious beliefs and cultural practices, wearing fully covered cloths, vegetarian food pattern and dwelling in multi-storied apartments are associated with low vitamin D levels in India (Sachan et al., 2005; Harinarayan et al., 2011). Recent studies show that a significant proportion of Indian females living in North as well as South including Muslims have hypovitaminosis D. Nearly 76% of South Indian females inclusive-of pregnant women, child bearing mothers and postmenopausal women have VDD (Harinarayan et al., 2011; Akhtar, 2016). Furthermore, 96% of neonates, 91% of healthy school girls and 84% of pregnant women in North India suffer from VDD (Sachan et al., 2005; Marwaha and Sripathy, 2008; Akhtar, 2016;). Prevalence of VDD is above 70% among healthy adult Pakistani population and another 21% has insufficient vitamin D levels (Akhtar, 2016). More importantly 55% of infants and 45% of nursing mothers in Pakistan have serum vitamin D below 10 ng/mL (Baig et al., 2007; Iqbal and Khan, 2010). Similar situation is observed in Bangladesh where many women wear a veil that restricts exposure to sun (Islam et al., 2006; Akhtar, 2016). Many studies, especially from South Asia support the link between limited sun exposure and low vitamin D level (Baig et al., 2007; Iqbal and Khan, 2010). According to the Thai 4th National Health Examination Survey, 57% of females and 33% males have a vitamin D level <30 ng/mL (Nimitphong and Holick, 2013).

Vitamin D is mainly synthesized in the skin (Nair and Maseeh, 2012; Wacker and Holick, 2013) but the process is influenced by environmental and lifestyle factors. People with dark skin are more susceptible to VDD probably because melanin pigment absorbs Ultra-Violet B (Nair and Maseeh, 2012). Sun screen applications and minimum outdoor activities are human behaviours that, reduce vitamin D production endogenously. Further, skin vitamin D production varies according to the time of the day, season of the year and the Zenith angle of the sun (Wacker and Holick, 2013).

Studies on vitamin D in Sri Lankan population are scarce. Limited data, however, show a high prevalence of VDD among community-dwelling women. Rodrigo et al (2013) showed that 56.2% women aged 20-40 years have either VDD or VDI (<35 nmol/L). (Rodrigo et al., 2013) A study conducted in the central part of Sri Lanka showed that, 58.6% of women aged 30-60 have vitamin D <50 nmol/L (Meyer et al., 2008).

The high prevalence of hypovitaminosis D in some Asian countries despite the abundance of sunlight throughout the year has raised many questions. Whether this is related to the restricted exposure to sunlight or the inability of the pigmented skin to produce sufficient vitamin D is not known. Further, the high prevalence observed is a result of the inappropriate cut-off values used to define VDD and VDI is also being raised.

It is important for a country to know the determinants of vitamin D level of the population. The information can be used in designing health promotion programs to optimize vitamin D level at

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population level. This will prevent indiscriminative use of vitamin D supplementation and thereby reduce the additional cost that patients have to bear.

The objectives of this study were to assess the prevalence of vitamin D deficiency and its associations with the diet and sunlight exposure among young women in two selected areas in Sri Lanka.

Materials and Methods

Study design and place
This cross-sectional study was conducted in Matara and Kandy districts in Sri Lanka.

Study sample
Two Pradeshiya Sabha Divisions (intermediate administrative unit) were selected from each district and two Grama Sewa Divisions (the smallest administrative unit) of each Pradeshiya Sabha Divisions were randomly selected for data collection. Community-dwelling women between 20-40 years of age were invited to participate in the study by posters displayed in public places. Women who filled the 'expression of interest form' were invited to take part in the study. Postmenopausal women, pregnant or breast-feeding mothers, women who had diseases (chronic diseases of liver, kidney, heart or lungs and endocrine diseases) or were on medications that can affect vitamin D metabolism (corticosteroids, hormonal contraceptives, diuretics, vitamin D supplementations) were excluded from the study sample.

Ethical considerations
Ethical approval was obtained from the Ethics Review committee of Faculty of Medicine, University of Ruhuna (Ref No. 09.03.2016:3.3). All the participants (n = 132) were educated about the research and their written consent was obtained before enrolling into the study.

Data collection
Data were collected by interviewing study participants individually using a content validated data sheet. Their weight and height were measured adhering to the standard protocols. Five milliliters of venous blood were drawn for biochemical analyses. Vitamin D analysis was performed by Chemiluminescence Binding Assay method using CobasElecsys 411 analyser (Roche Diagnostics International Ltd, Switzerland). Total calcium analysis was performed by colorimetric method using a laboratory test kit. Exposure to sunlight was measured as the number of hours stayed out-door between 6.30 a.m. - 6.30 p.m. while not taking measures to avoid sun exposure (use of an umbrella or sun protection cream). The times of sunrise and sunset were monitored with the meteorological department website during the study period. Participants were divided into two categories as; those who had sun exposure time <2 hours/ day and 2-6 hours/ day.

Amount of dairy and non-dairy vitamin D rich food intake was estimated by a food frequency questionnaire. Dairy food consumption was measured as the number of glasses of milk (either fresh milk or milk powder), wedges of cheese, tea spoons of butter and cups of yogurt and curd. These numbers were added and total diary intake was calculated in units per week. The weekly intake of non-dairy vitamin D rich food was calculated in the same manner considering weekly consumption of fish and meat products (pieces).

Based on the consumption, subjects were categorized as 'low', 'medium' and 'high' consumption considering 33rd and 66th percentiles to decide the cut-off level of those categories. (The cut-off values of dairy food consumption; 0 - 9 'low', 10 - 15 'medium' and 16 ≤ 'high'. In non-dairy vitamin D rich food consumption; 18 - 51 'low', 52 - 70 'medium' and 71 ≤ 'high'.)

Statistical analysis

All anthropometric measurements and calcium levels are presented as mean ±SD. Vitamin D is presented as median (IQR). Pearson and spearman correlations were calculated to assess the associations between continuous variables. Independent t-test, ANOVA followed Bonferroni post-hoc test, Mann Whitney U-test and Kruskal-Wallis test were used to detect significant differences between groups. $p < 0.05$ was considered as statistically significant.

Results

Mean (±SD) body weight, height, BMI and age of the study sample were 55.2 (±11.0) kg, 155 (±5.9) cm, 23 (±4.5) kg/m^2 and 31.3 (±5.9) years, respectively. Mean total serum calcium was 9.28 (±0.64) mg/dL. Median (IQR) of serum vitamin D was 19.54 (15.38 - 24.55) ng/mL. Median serum vitamin D level was not different in the two districts or in two age groups (Table 1).

Table 1- Serum vitamin D levels and calcium at different age categories and two districts

Variable		N	Vitamin D (ng/mL) Median (IQR)	Calcium (mg/dL) Mean (±SD)
District	Matara	71	19.56 (14.1-24.4)	9.39 (±0.36)
	Kandy	61	19.11 (16.37-24.86)	9.16 (±0.85)
Age (years)	20-30	60	19.02 (15.3-24.86)	9.42 (±0.67)
	31-40	72	20.1 (15.41-24.39)	9.17 (±0.60)

This table shows median (IQR) serum vitamin D (ng/mL) and mean (±SD) calcium (mg/dL) levels of women in two districts and two age categories.

Vitamin D cut-off values published by Lips *et al.* were used to assess vitamin D status in this study group (Lips et al., 2001; Lips, 2007). According to that, vitamin D <10 ng/mL- "deficient" (VDD), 10 - 20 ng/mL "insufficient" (VDI), vitamin D >20 ng/mL- "adequate". VDD was observed in 6.1% (n = 8) subjects while 51.5% (n = 68) were VDI (10 - 20 ng/mL). Only 42.4% women in the study sample (n = 56) had normal (>20 ng/mL) vitamin D levels. No significant correlations were observed between serum vitamin D and age (r = -0.01, *p* = 0.90) body weight (r = -0.11, *p* = 0.21) or BMI (r = -0.11, *p* = 0.21).

Among the study participants, 81 people reported sun exposure <2 hours while the rest (n = 51) reported sun exposure 2 - 6 hours per day during their routine work. Majority of women with VDD (75%) and VDI (69%) had been exposed to sun light less than two hours per day. Vitamin D level of women who had been exposed to sun light <2 hours per day (19.11 ng/mL) was significantly lower (*p* = 0.009) compared to women who had 2 - 6 hours of sun exposure (22.93 ng/mL). Among women who had <2 hours sun exposure, 60.5% were vitamin D deficient. In contrast, only 43.1% of women with 2 - 6 hours of sun exposure was vitamin D deficient.

Table 2 shows the vitamin D and calcium levels in different categories based on dairy or non-dairy food intake.

Table 2- Vitamin D status of dairy and non-dairy food categories of premenopausal women

Food type	Variable	Food quantity		
		Low	**Medium**	**High**
Non-dairy food	Number (n)	46	42	44
	Vitamin D median (IQR) ng/mL	17.51 (13.24-20.23)	18.8 (12.51-24.82)	22.10 (18.05-27.56)
	Calcium mean (±SD) mg/dL	9.27 (±0.69)	9.18 (±0.55)	9.40 (±0.66)
Dairy food	Number (n)	48	42	42
	Vitamin D median (IQR) ng/mL	18.43 (14.36-25.82)	18.19 (14.48-23.25)	23.22 (17.6-27.06)
	Calcium mean (±SD) mg/dL	9.25 (±0.64)	9.26 (±0.53)	9.34 (±0.75)

Note: SD = standard deviation, IQR = interquartile range

Vitamin D showed a positive association with the amount of dairy food intake per week ($r = 0.189$, $p = 0.04$). Vitamin D levels of 'medium' and 'low' diary groups were significantly lower compared to 'high' diary group (table 2, $p = 0.03$ and 0.01 respectively). However, vitamin D level between 'low' and 'medium' dairy groups was not significantly different ($p > 0.05$).

Further, serum vitamin D showed a positive correlation, with the intake of non-dairy vitamin D rich food ($r = 0.263$, $p = 0.01$). The mean serum vitamin D level of 'high' non-dairy group was significantly higher compared to 'low' and 'medium' groups ($p = 0.01$ and $p = 0.03$ respectively). However, there was no significant difference of vitamin D level between the 'low' and 'medium' non-dairy groups.

Discussion

This study shows a high prevalence of VDD/VDI among community dwelling healthy females of 20 - 40 years in two selected districts in Sri Lanka. Further, the study demonstrates a positive association between vitamin D and exposure to sunlight. In addition, high dietary intake of vitamin D, both dairy or non-dairy, is associated with higher serum vitamin D level.

The high prevalence of VDD/VDI seen among study subjects is concordant with previous studies undertaken in Sri Lanka (Meyer et al., 2008; Rodrigo et al., 2013). Unlike previous studies which included one area (Meyer et al., 2008; Rodrigo et al., 2013) we recruited subjects from two geographically distinct regions in the country. While Matara is in the Southern coastal area, Kandy is in the mid country and has a mountainous geography. We found no regional difference in vitamin D level in this study.

Previous studies have shown a high prevalence of hypovitaminosis D among females despite the abundance of sunlight throughout the year (Sachan et al., 2005; Marwaha and Sripathy, 2008; Harinarayan et al., 2013; Nimitphong and Holick, 2013;). There are uncertainties regarding the adequate duration and the ideal time of the day for sun exposure required for adequate vitamin D synthesis (Lips et al., 2006; Wacker and Holick, 2013). According to

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Nimitphong and Holick, exposing face and arms to sunlight for 25 minutes, 3 times a week at 9 a.m. helps maintaining adequate vitamin D level (Nimitphong and Holick, 2013). We too observed a significant association between the duration of sun exposure and vitamin D level. The majority of women (61%) in our study were office workers with very limited sun exposure. Most of them reported only 5-10 minutes sun exposure, mostly in early morning or late evening where UV-B exposure is minimum. A study conducted in India shows that, the maximum endogenous vitamin D production is between 11.00 a.m. and 2.00 p.m. when the zenith angle is narrow (Harinarayan et al., 2013).

Apart from restricted sun exposure, dark skin and clothing pattern may have contributed to hypovitaminosis D seen among our subjects. Melanin pigment absorbs UV-B light making skin vitamin D production ineffective. Hence, people with dark skin need more sun exposure to achieve optimum vitamin D level (Nair and Maseeh, 2012; Wacker and Holick, 2013). Sri Lankans usually possess a dark skin colour and thus need to stay longer under the direct sunlight. The majority of our subjects wore "Saree" for work which covered the entire body except the face and part of upper arms.

Fatty fish is the richest natural food source of vitamin D while egg yolk and cod liver oil are also rich in vitamin D (Calvo et al., 2005). Vitamin D content in other dietary sources is minimal unless they are fortified. Strict vegetarians are at high risk of hypovitaminosis D. Fortified food items are expensive and they are not very popular in Sri Lanka and other developing South-Asian countries (Ritu and Gupta, 2014a).

We presume that our findings could be of interest to many sections related to community health in Sri Lanka. This study will add to the emerging body of evidence that VDD and VDI are prevalent in Sri Lanka. The positive association of vitamin D with sun exposure and some food products can be used in health promotion campaigns. Life style modifications would be the best option to address hypovitaminosis D which has a high prevalence. Fortification of commonly used food items with vitamin D can also be considered. Many countries have adopted the policy of fortifying commonly consumed food items to combat hypovitaminosis D (Calvo et al., 2004; Ritu and Gupta, 2014b).

As a health promotion behaviour, people can be encouraged to have more sun exposure. In Sri Lanka, day time temperature varies from 26°C to 32°C, except in the hill country (Department of Meteorology Sri Lanka, 2016). People avoid sun exposure due to high temperature and high humidity especially in hours where vitamin D production is maximum (Harinarayan et al., 2013).

Future research is needed to investigate the best time and the optimum period of sun exposure that enhance vitamin D production in the local setting. Attention should be paid to the detrimental effects of sun exposure particularly the possibility of skin malignancies. Further, it is essential to identify food items that can be fortified with vitamin D in Sri Lankan context. These food items should be freely available, affordable and acceptable to all communities.

Indiscriminate vitamin D supplementation should not be considered until inexpensive life-style modifications are implemented and the cost effectiveness of such supplementation is proven. Recent reports highlight the emergence of hypercalcaemia due to indiscriminate use of vitamin D by clinicians in some countries (Pirotte et al., 2015; Guerra et al., 2016).

This study has few limitations. Subjects were selected by open invitations and those who responded could be health-conscious people. This may make the sample not representative of the population. Also, we have studied only middle-aged women and this data cannot be applied to men and women outside this age range. Measurement of sun exposure was crude and we

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suggest prospective studies where subjects maintain a record of daily sun exposure and food intake as well.

Conclusions

In conclusion, our results show a high prevalence of vitamin D deficiency/insufficiency among community dwelling healthy middle-aged women in Sri Lanka. Data also indicate a positive association of vitamin D with the duration of sun exposure and daily consumption of food rich in vitamin D. Interventions should be planned based on sun exposure and diet to overcome this prevalent problem.

Conflict of Interest

The authors declare that there is no conflict of interest.

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Identification of Biomarker Profile for Chronic Kidney Disease of uncertain aetiology in Sri Lanka

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Abstract

Background: Chronic Kidney Disease of uncertain aetiology (CKDu) is a major health problem in Sri Lanka. Current laboratory markers are not sensitive enough for early detection of CKDu. It is evident that a more efficient, sensitive and specific diagnostic procedure is needed for early detection and to confirm the diagnosis of CKDu.

Objectives: To identify a representative biomarker profile for CKDu, Sri Lanka and to study the applicability of these biomarkers in identifying at risk population for screening and diagnosis of CKDu, Sri Lanka

Methods: Girandurukotte and Wilgamuwa which are considered as CKDu endemic areas were selected for the study to recruit definite non-dialysis CKDu cases (n = 119), endemic CKD (n = 82) and endemic healthy controls (n = 79). Non-endemic CKD group (n = 85) and healthy controls (n = 85) were recruited from Kandy. Routine markers and novel biomarkers for CKDu were measured using serum and random urine of CKDu patients. The eight selected renal biomarkers were measured using multiplex biomarker assay, and the data were analyzed using logistic regression algorithm aiming to extract the best marker combination that could distinctly identify the disease groups noninvasively from the healthy controls. Data were analyzed using SPSS and R software.

Results: Among the selected patients, 97 (81.5%) were males while 22 (18.5%) were females. Under routine markers, hyperuricemia, acidosis, hypomagnesemia, vitamin D deficiency, anemia, increased level of serum osmolality, amylase, Lactate Dehydrogenase and Alkaline Phosphatase were identified. Alpha1 microglobulin (A1M) stood out as the single strong candidate marker that was highly specific (84.7%) in identifying CKDu from healthy controls. Combination of A1M+ Kidney Injury Molecule 1 (KIM1) + Retinol Binding Protein 4 (RBP4) was able to accurately differentiate the disease groups (CKDu/CKD), from healthy controls. Combination of Osteopontin + KIM1+ RBP4 accurately predicted CKDu with high performance from a CKD background. Higher mean (±SD) value (69587 ng/mL) of Transforming Growth factor beta 1was obtained from the CKDu group compared to the other controls with a significant negative correlation (r = -0.293, p <0.01) with the serum creatinine.

Conclusions: A representative biomarker profile has been identified for identification of risk population for screening and diagnosis of CKDu. Biomarker combinations are helpful to diagnose CKDu effectively and non-invasively.

Keywords: *Chronic kidney disease of uncertain aetiology, Chronic kidney disease, Biomarkers, Alpha1microglobulin*

Background

From 1990s, an increase in Chronic Kidney Disease (CKD) prevalence and emergence of a Chronic Kidney Disease of uncertain aetiology (CKDu) was observed in several tropical and subtropical countries including El Salvador, Egypt, India, Central America, Nicaragua and Sri Lanka (Weaver *et al.*, 2015). Among them, Sri Lanka reports the highest occurrence of CKDu, in rural dry zone where extensive farming is carried out. CKDu was first reported in Sri Lanka in early 1990s, and over the last 10 years its prevalence has progressively increased to epidemic levels (Jayatilake *et al.*, 2013). A common observation has been that CKDu is caused by multiple factors, likely linked to a combination of environmental factors, diet and nutritional practices, and genetics (Elledge *et al.*, 2014).

The CKDu is an environmental nephropathy reported from Central America, India, Taiwan and Sri Lanka causing significant morbidity and mortality. This is the first study which describes the biomarker profile of non-dialysis patients with the diagnosis of definite CKDu, in Sri Lanka. Many Risk factors have been postulated for CKDu by different studies, which suggest the possibility of a multifactorial causation of the disease (Bandara *et al.*, 2008). Family history of CKD is especially important in diagnosis of CKDu because positive family history of CKD indicates a genetic tendency of CKDu and a higher probability to have CKDu. Hence, this needs further exploration with proper medical data. Previous studies have reported a family history of chronic kidney disease as significant predictors for CKDu (Wanigasuriya *et al.*, 2008; Wanigasuriya *et al.*, 2011; Athuraliya *et al.*, 2011).

Studies on complications of CKDu are rare up to date. According to Fernando *et al* (2019a), a significant association of the prevalence of anemia with the CKDu severity has been observed (Fernando *et al.*, 2019a). Earlier, CKDu case definition in Sri Lanka was based on persistent albuminuria defined as an albumin to creatinine ratio (ACR) of > 30 mg/g in an initial urine sample and at a repeated visit (Jayatilake *et al.*, 2013). Noble *et al* (2014) described a criterion including exclusion of all known aetiology of CKD, with proteinuria < 300 mg/L for 24-hour urine in three consecutive months, no hematuria, increased echogenicity in ultra sound scan, biopsy with tubular interstitial pathology and small size of kidney, living in a CKDu endemic area more than for five years for classification of CKDu patients (Noble *et al.*, 2014). Some factors in above methods are not sensitive enough to detect CKDu patients in early stages at the moment. Of note, a link between serum creatinine level and eGFR has been established wherein serum creatinine concentrations increase only when approximately 40-50% of renal parenchyma is damaged (Steubl *et al.*, 2016).

Evolving criteria have been applied in the diagnosis of CKDu but still it is a diagnosis of exclusion of known causes like Diabetes Mellitus (DM), chronic or severe hypertension, snake bite with systemic envenomation, glomerular nephritis obstructive nephropathies and other renal diseases (Fernando *et al.*, 2019). Recently Wijewickrama *et al* (2019) have described a new epidemiological case definition to identify CKDu in Sri Lanka (Wijewickrama *et al.*, 2019). This study focused to identify representative biomarker profile (routine and novel biomarkers) for CKDu in Sri Lanka and study the applicability of these biomarkers in identifying at risk population for screening and diagnosis of CKDu in Sri Lanka. It will help to detect CKDu in early stages in patients in Girandurukotte and Wilgamuwa and other affected areas. Identifying the unique features of CKDu compared to the other forms of CKD will give a chance to screen and monitor the patients.

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Materials and Methods

Girandurukotte and Wilgamuwa which considered as endemic areas were selected for the study to recruit non-dialysis, definite CKDu cases (n = 132), endemic CKD (ECKD: n = 82) and endemic healthy controls (EC: n = 79). Non-endemic CKD group (NECKD: n = 85) and Non-endemic controls (NEC: n = 85) were recruited from, Kandy. Healthy controls were apparently healthy people without any diagnosed medical conditions by clinical examination and past medical history along with the normal serum creatinine and no proteinuria.

The ethical clearance for the study was obtained from ethical review committee of the Faculty of Medicine, University of Peradeniya (2016/EC/28). Written informed consent was obtained from the participants of the study and clinical details were recorded. The height and weight were measured for the Body Mass Index (BMI, kg/m^2) calculation according to the standard protocols. Blood and random urine samples were taken for the analysis. In the pilot study done on serum and urine of definite CKDu cases, 27 novel biomarkers were analyzed using Luminex Magpix machine. According to the results of the pilot study, one serum marker Transforming Growth Factor (TGF beta 1) and eight urinary markers [Kidney injury Molecule 1 (KIM 1), Neutrophil Gelatinase-associated lipocalin (NGAL), Tissue Inhibitor Matrix metalloproteinase 1 (TIMP 1), Alpha 1 microglobulin (A1M), Beta 2 microglobulin (B2M), Osteopontin (OPN), Cystatin C (Cys C) and Retinol Binding Protein 4 (RBP4)] were shortlisted using their level of expression and clinical significance. Selected markers from the pilot study were applied for the case-control study. The urinary levels of the eight selected renal biomarkers were quantified using multiplex biomarker assay using xMAP technology, and the data were subjected to systematic analysis using logistic regression algorithm aiming to extract the best marker combination that could distinctly identify the disease groups non-invasively from the healthy controls (Fernando *et al*., 2019b). Some samples were rejected due to inadequate sample volume, unclear labeling and hemolysis of the sample. Hence 75 CKDu samples were selected for the biomarker analysis. To increase the power of the results, at least 50% or more than 50% of the number of cases were selected as controls. The urinary levels of eight selected renal biomarkers, KIM1, NGAL, B2M, A1M, CST3, OPN, TIMP1 and RBP4, were quantified using Milliplex multiplexing protein assay. In addition, urine and serum creatinine levels were measured in every sample and protein measurements were adjusted to urine creatinine level. For differentiating the CKDu/ CKD from healthy controls, distribution of protein markers across different categories was assessed using Receiver Operating Characteristic Curve (ROC) analysis. Routine markers were measured using serum and random urine. For the case group, initially 132 cases were recruited according the inclusion and exclusion criteria, only 119 CKDu cases participated for the assessment of full biochemical profile at the Teaching Hospital Kandy. Biochemical parameters were analyzed using Indiko plus Analyzer, osmometer. Hemoglobin was measured using a hematology analyzer.

Non-dialysis, definite CKDu patients were recruited according to the criteria developed by Sri Lankan Society of Nephrology (SLSON) (Wijewickrama *et al*., 2019). According to eGFR (mL/min/1.73 m^2), CKDu was graded as stage 1 (eGFR $\geq$ 90), 2 (eGFR 60 – 89), 3a (eGFR 45-59), 3b (eGFR 30-44), 4 (eGFR 15-29) and 5 (eGFR < 15) (KDIGO, 2013). The Chronic Kidney Disease-Epidemiology Collaboration (CKD-EPI) equation was used for the estimated eGFR (Levey *et al*., 2009). Stage 1, 2 and 3a were taken as early stage and stage 3b, 4 and 5 were taken as late stage of the CKDu. Data were analyzed using SPSS (IBM statistics version 23.0) and R software.

Results

Out of 132 recruited patients, only 119 patients participated for all laboratory investigations. Among the selected patients, 97 (81.5%) were males while 22 (18.5%) were females. Demographic data, lifestyle and health characteristics of the non-dialysis patients with definite CKDu are shown in Table 1.

Table 1: Demographic and clinical characteristics of the study subjects (n = 119)

Variable	Mean ±SD (Range) or Number (Percentage %)
Age (years)	51 ± 9 (19 -76)
Sex distribution: Male	97 (81.5%)
Female	22 (18.5%)
Weight (kg)	58.6 ±12
Height (m)	1.62 ±0.22
BMI (kg/m^2)	22.1 ±3.6 (15 – 33.3)
Systolic BP (mmHg)	124 ±13 (80 – 160)[a]
Diastolic BP (mmHg)	78 ±7 (60 – 100)
Occupation as a farmer	88 (74%)
Family history of CKD	61 (51%)
Smoking (males only)	48 (40%)
Chewing betel	93 (78%)
Alcohol (males only)	50 (42%)

Note: Values are expressed as numbers with proportion of populations for each characteristic (%), or as mean ±SD as appropriate.
[a] Four-patients had increased systolic blood pressure; SD, standard deviation; BMI, body mass index; BP, blood pressure; CKD, chronic kidney disease

The 74% of the patients' age were 40 to 60 years. Out of the total, 74% were farmers. Average BMI in all CKDu patients was within the normal range. Higher BMI (> 25 kg/m^2) was observed in 20.2% of CKDu patients while it was 14% for lower BMI (< 18 kg/m^2). According to the urine analysis, urine Sulfosalicylic acid test showed abnormal urine protein (+, ++, +++ or > +++) in 31 patients (26%). The CKDu patients had the highest percentage of family history of CKD (51%) and chewing betel (78%).

The prevalence of anaemia was 72.3% and it was significantly higher in females (95.4%) than males (67.01%) ($p < 0.001$). Among CKDu cases, 76.7% had mild anemia while 23.3% had moderate anemia. Severe anemia (Hb <8.0 g/dL) was not observed in any patient. The prevalence of anemia increased with worsening renal function; 66.7% in stage 1, 60% in stage 2, 50% in stage 3a, 95% in stage 3b, 79.2% in stage 4, 100% in stage 5.

Average levels and clinical significance of biochemical laboratory findings in serum of CKDu patients are presented in Table 2 (Fernando *et al*., 2020). The mean for all the blood investigations are within the reference interval except for the raised serum creatinine, uric acid, amylase, alkaline phosphatase, and decreased eGFR (Table 2). Only some CKDu patients had hyperuricemia (34.5%), hypophosphatemia (5%), hypocalcemia (13.4%) and acidosis (16.8%). Alkaline phosphatase (62.2%) and amylase (79.8%) were increased in a majority. Under these investigations, hyperuricemia, acidosis, hypomagnesemia, vitamin D deficiency, anemia, increased level of serum osmolality, amylase, Lactate dehydrogenase (LDH) and Alkaline Phosphatase (ALP) were identified.

Table 2: Biochemical laboratory findings in serum of CKDu patients in Girandurukotte and Wilgamuwa (n = 119)

Parameter	Mean ± SD	Normal N (%)	Low N (%)	High N (%)	Reference Range
Sodium (mmol/L)	140.4 ±6	64 (53.8)	28 (23.5)	27 (22.7)	136 - 145
Potassium (mmol/L)	4.5 ±0.6	98 (82.4)	5 (4.2)	16 (13.4)	3.5 – 5.1
Calcium (mg/dL)	9.1 ±0.5	98 (82.4)	19 (16)	2 (1.6)	8.6 – 10.3
Phosphorous (mmol/L)	1.06 ±0.24	96 (80.7)	17 (14.3)	06 (5.0)	0.87 – 1.45
Creatinine (µmol/L)	178.1 ±122	40 (33.6)	NA	79 (66.4)	M < 113 F < 96
Urea (mg/dL)	31 ±14	95 (79.8)	4 (3.4)	20 (16.8)	13 – 43
Uric Acid (mg/dL)	6.6 ±1.7	78 (65.5)	NA	41 (34.5)	M - 3.5 – 7.2 F - 2.6 – 6.0
Total Protein (g/L)	72 ±4	116 (97.5)	2 (1.7)	1 (0.8)	64 – 83
Albumin (g/L)	44 ±2	118 (99)	NA	1 (0.8)	35 – 52
Amylase (U/L)	153 ±64	24 (20.2)	NA	95 (79.8)	< 100
LDH (U/L)	220 ±38	70 (58.8)	NA	49 (41.2)	135 – 225
Bicarbonate (mmol/L)	25.4 ±3.3	83 (69.7)	20 (16.8)	16 13.5)	22 – 29
GGT (U/L)	35 ±29	102 (85.7)	NA	17 (14.3)	M < 55 F < 38
SGPT (U/L)	29 ±21	97 (81.5)	NA	22 (18.5)	M < 45 F < 34
SGOT (U/L)	28 ±14	98 (82.4)	NA	21 (17.6)	M < 35 F < 31
ALP (U/L)	162 ±204	44 (37)	1 (0.8)	74 (62.2)	35 – 105
Vitamin D (ng/mL)	31.9 ±15.3	44 (37)	74 (62.2)	1 (0.8)	30 – 100
T.Cholesterol (mmol/L)	5 ±1	69(58.0)	36 (30.2)	14 (11.8%)	<5.2 Desirable 5.2-6.2 Borderline high >6.2 High
Magnesium (mmol/L)	0.93 ±1.25	79 (66.4)	35 (29.4)	5 (4.2)	0.66 – 1.07
Hemoglobin (g/dL)	12.1 ±1.5	33 (27.7)	86 (72.3)	NA	M < 13 F < 12
Serum Osmolality, (mOsm/kg) (n=118)	300 ±23	56 (47.4)	4 (3.4)	58 (49.2)	275 – 295
Urine Osmolality (mOsm/kg) (n=118)	385 ±160	74 (62.7)	42 (35.6)	02 (01.7)	300 – 900

SD, standard deviation; LDH, lactate dehydrogenase; GGT, gamma glutamil transferase; SGPT, serum glutamate-pyruvate transaminase; SGOT, serum glutamate-oxaloacetate transaminase; ALP, alkaline phosphatase; M, male; F, female; NA, not available

From the evaluation of the markers across all comparisons, A1M was identified as the single best candidate marker with the highest performance (CKDu vs NEC; Sensitivity = 92%, specificity = 847%). The Area Under Curves (AUC) were comparably high with the highest sensitivity (92%) achieved for CKDu. The AUC for the A1M in CKDu, ECKD and NECKD groups against NEC were 0.914, 0.913 and 0.891 (Fernando *et al*., 2019b).

According to the findings of this study, a biomarker signature panel, representing diverse CKD scenarios is ideal instead of a single marker to improve the efficiency of CKD diagnosis in community screening. Towards this goal, logistic regression models were trained using the most discriminated proteins that can stratify the disease from the control group for all three comparisons as described in methods. Two different marker combinations were identified that can discriminate the disease group from the healthy controls. Among them, A1M+KIM1+RBP4 combination showed higher sensitivity than serum creatinine for all disease types (CKDu, NECKD and ECKD) against the healthy control group (NEC) and displayed a high AUC of 0.903 (Figure 1). The second marker combination OPN+KIM1+RBP4 showed a good AUC in discriminating the CKDu from other CKD diseases (Figure 2). This accentuates the need for developing high-performing new marker signature that can accurately identify CKDu subjects for disease stratification and proper patient management, thus emphasizing on the usefulness of our proposed 3-marker signature (Fernando *et al.*, 2019).
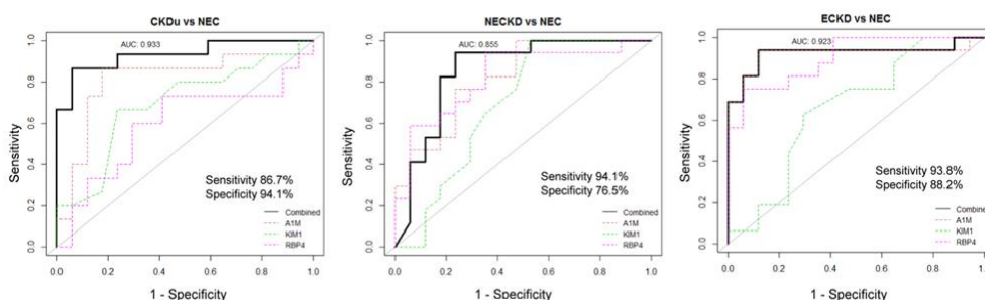
Figure 1: Best marker combination A1M+KIM1+RBP4 in distinguishing CKD/CKDu from NEC
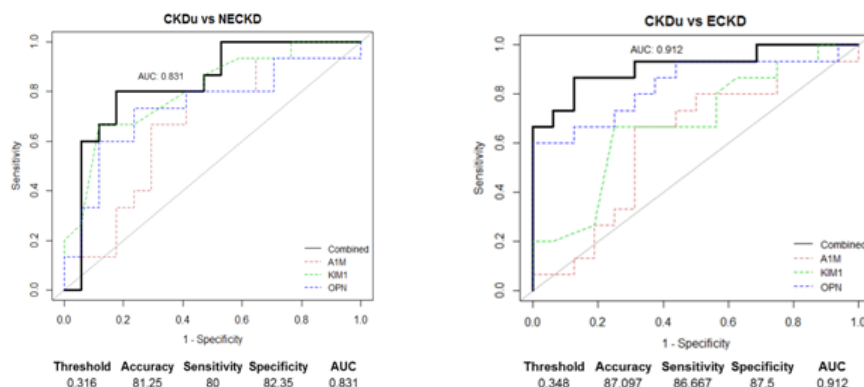
Figure 2: Best marker combination OPN+KIM1+RBP4 in distinguishing CKDu from other CKD disease groups

According to the results of the pilot study of novel biomarkers, the only serum biomarker selected was TGF beta 1. There was a significant difference ($p < 0.001$) in mean TGF beta1 (69587 ng/mL) of CKDu with other four control groups. But there was no significant difference between the healthy control groups (EC & NEC) and CKD groups (ECKD &

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NECKD). In CKDu group, there was a significant negative correlation of TGF beta 1 with the serum creatinine (r = -0.293, p <0.01) and significant positive correlation with the eGFR (r = 0.332, p <0.01).

Discussion

Results of the current study were conducted in CKDu definite cases, compatible with most of the previously described manifestations of CKDu. Moreover, some specific patterns including hyperuricemia, acidosis, hypomagnesemia, anemia, increased level of serum osmolality, amylase, LDH and ALP have been identified which need to be validated in a larger group. It was observed that chewing betel was significantly high among CKDu patients.

In this study, we took advantage of the renal biomarkers previously reported for CKD and assessed their predictive performance in the context of CKDu. Potential marker combinations that can be used to distinguish CKD population from healthy controls and to stratify CKDu patients from all subjects diagnosed with CKD were identified. Since the diagnostic signatures we propose in this study are based on urine biomarkers, the screening process is non-invasive to be implemented in at-risk populations. Currently, the identification of CKDu relies on biomarkers used to diagnose CKD in general, which includes serum creatinine and urinary protein. Recently, several surrogate markers have been reported to perform better in diagnosing CKD and CKDu. For example, CST3 is reported to better predict the clinical outcomes of CKD than creatinine (Qiu *et al*., 2017). CKDu characteristically affects tubulointerstitium and notably, A1M is an indicator of renal tubular function.

In comparison to using single marker, our analysis suggested higher predictive performance of combination biomarker signature consisting of A1M+KIM1+RBP4 in accurately identifying the disease groups, particularly CKDu and NECKD. Of note, this marker panel was found to be uniquely predictive for CKDu and not for ECKD. CKDu and ECKD both occur in the endemic region and because of the unidentified etiology, CKDu patients are often misdiagnosed as diabetic or hypertensive kidney disease if they have concomitant diseases. The novel biomarker signature thus holds a greater potential in improving clinical decisions, leading to better patient management and clinical care. There may be some unique feature to increase TGF beta 1 in CKDu than the control groups. The negative correlation of TGF beta 1 with the serum creatinine led to the increasing of TGF beta 1 in the early stages provides a good clue for early diagnosis of CKDu. There are multiple challenges for the development of clinically useful biomarkers with their discovery, confirmation, validation and clinical assessment.

Conclusion

In the present study, a representative biomarker (routine and novel) profile has been identified to screen the population at risk and for diagnosis (with unique patterns) of CKDu. A1M is the single strong candidate marker that was highly specific in identifying CKDu/CKD from healthy controls. The study reveals that combination of biomarker panel is more useful in diagnosis of CKDu. The serum biomarker, TGF beta 1 can be used for early detection of CKDu. Further studies should be conducted in larger validation group for better identification of clinically useful novel biomarkers for CKDu.

Conflict of interests
The authors declare that there is no conflict of interest.

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Oral Presentations

OP 01

Acute, Chronic Pain and Its Association with Serum Interleukin-6 and Highly Sensitive C Reactive Protein in Patients with Cervical or Lumbar Disc Herniation

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Background: Intervertebral Disc Herniation (IDH) that occurs mainly in the lumbar and cervical region of the spine is a common cause for radiculopathy and associated pain. IDH is often accompanied by acute and chronic pain. Inflammation is a major cause for radiculopathy and such local inflammation caused by Interleukin-6 (IL-6) which is believed to be a pro-inflammatory marker in C-reactive protein (CRP) production. CRP is the first acute phase protein to appear and is a sensitive marker of tissue damage and local inflammation. However, in radiculopathy, subtle changes in local inflammation may not be detected in routine CRP analysis, therefore, highly sensitive CRP (hs-CRP) would be a better indicator in IDH.

Objectives: To assess the pain duration (acute/chronic) and its association with IL-6 and hs-CRP in patients with cervical disc herniation (CDH) or lumbar disc herniation (LDH)

Methods: A descriptive cross-sectional study was conducted using 77 patients (18-70 years) with either CDH or LDH. Venous blood (5 mL) was collected and hs-CRP was analyzed by automated clinical analyzer while IL-6 was estimated by Enzyme Linked Immunosorbent Assay. Subjects with neck/back pain for >3 months were regarded as acute pain patients whereas subjects with persisted pain for <3 months were categorized as chronic patients. Mann-Whitney U test was used for statistical analysis and $p <0.05$ was considered as significant.

Results: Majority of the patients presented with LDH (64.9%). Highest percentage had chronic pain (62.3%), whereas the remaining suffered from acute pain. Patients with chronic neck/back pain showed significantly ($p = 0.04$) higher IL-6 level (mean rank= 40.9 pg/mL) compared to patients with acute neck/back pain (mean rank= 30.35 pg/mL). Hs-CRP level was higher in patients with acute neck/back pain (mean rank= 42.5 mg/L) compared to that of patients with chronic neck/back pain (mean rank= 36.8 mg/L) which did not show significant difference ($p = 0.28$) among the study groups of acute and chronic pain. There was no significant correlation between serum IL-6 and hs-CRP levels ($r = 0.02$, $p >0.05$).

Conclusions: Present study showed increased level of hs-CRP in patients with acute neck/back pain as an initial response to inflammation around nerve roots. However, IL-6 levels were higher in patients with chronic neck/back pain recommending further investigations with other similar pro-inflammatory markers with duration of pain. There was no significant correlation between serum IL-6 and hs-CRP levels.

Keywords: *Cervical disc herniation, Duration of pain, Highly sensitive C-reactive protein, Interleukin-6, Lumbar disc herniation*

OP 02

Assessment of Dilutional Linearity of Six Common Serum Tumour Markers Using Commercial Diluents and Pooled Serum on Automated Immunoassay Platforms

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Background: Tumour markers are produced in the body on cancers and quantified in laboratories for diagnosis of malignancies. If concentrations of markers lie beyond the analytical ranges, dilutions are performed. The dilutional linearity, the deviation of concentrations by dilutions, indicates the accuracy and it should be excellent to obtain readings of dilutions as analyte concentrations. The dilutions are performed in small dilution factors instead of maximum dilution factors (MDFs) which give high accuracy by diluting interfering substances. But the use of MDFs requires a high volume of diluents. Therefore, the determination of MDFs and cost-effective alternative diluents are important for routine laboratory settings**.**

Objectives: To assess dilutional linearities and define MDFs for selected six tumour markers using commercial diluents and pooled human serum on automated platforms

Methods: The requests received to Teaching Hospital-Karapitiya within 3 months (October-December, 2019) were counted to find the number of dilution-required samples. Retained samples (n = 7 per marker) with high concentrations of analyte [Carbohydrate Antigen 125 (CA-125), Prostate-Specific Antigen (PSA), Ferritin, Thyroglobulin (TG), Alpha-fetoprotein (AFP) and β**-**Human Chorionic Gonadotropin (β-HCG)] were diluted as 1:10,1:20,1:50,1:100 and 1:200 using commercial diluents and in-house prepared serum pool and analyzed in automated analyzers (Snibe Maglumi 1000 and Vitros 3600 analyzers). Non-parametric and recovery studies were performed.

Results: The 5-15% of received samples were required dilutions within 3 months. The Kendall's coefficients were nearby 1 (0.921-0.995), illustrating satisfied dilutional linearities of assays. There were no significant differences ($p > 0.05$) among results generated by diluents and pooled serum. The acceptable MDFs were defined by considering "mean recovery percentages" and "p-values". The acceptable MDFs for β-HCG, AFP, TG, ferritin and CA-125 were 1:50, 1:20, 1:50, 1:20 and 1:20 respectively in commercial diluents. The acceptable MDFs for β-HCG, AFP, PSA, TG, ferritin and CA-125 were 1:50, 1:200, 1:200, 1:50, 1:100 and 1:100 respectively in pooled serum.

Conclusions: The pooled serum can be used with high MDFs as 1:200 for assays of serum AFP and PSA and 1:100 for serum ferritin and CA-125. The pooled serum is more preferable for maximum dilutions due to cost-effectiveness.

Keywords: *Dilution, Dilutional linearity, Maximum dilution factor, Tumor marker*

OP 03

Antimicrobial Potential in Poultry Feed Used in Poultry in Kegalle District

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Background: Rampant use of antibiotics in the livestock sector makes a significant contribution for the development and spread of antibiotic resistance.

Objectives: To determine the presence of antimicrobial activity in poultry feeds used in Kegalle district and to determine the awareness of poultry farm owners on potential effects from feeding practices on the increase of antimicrobial resistance

Methods: Two samples of poultry feed from each shop and three samples of both feed and water that are ready to serve in each farm were collected. Agar well diffusion method was used to determine the antibiotic effects against *Staphylococcus aureus* (ATCC 25923), *Escherichia coli* (ATCC 25922) and *Pseudomonas aeruginosa* (ATCC 27853). Gentamicin and sterile distilled water were used as positive and negative controls respectively. An interviewer administered questionnaire was used to collect data from farm owners.

Results: No inhibition zones were detected against three standard organisms for all samples of poultry feed collected from all 18 farms and for two types of poultry feed taken from all four shops. Mean diameters of zones of inhibition detected in water samples against above mentioned three organisms are 31.0, 21.5 and 20.0 mm respectively. The 78% of farm owners declared that they mix different types of antibiotics containing additives into the water served to animals. The 44% of farm owners believe that use of antibiotics is harmful for human health while a similar percentage claims that it is a favorable practice. None of the farm owners were aware that use of antibiotics in poultry contributes to the increasing antibiotic resistance.

Conclusions: Antimicrobial activity was not detected in poultry feeds used in Kegalle district. However, water served to animals in poultry showed antimicrobial activity. The awareness of farm owners on antibiotic use in poultry and its effect on the increase of antibiotic resistance is unsatisfactory.

Keywords: Antibiotics, Antibiotic resistance, Additives, Poultry feeds

OP 04

Hepatoprotective Activity of *Osbeckia octandra* Capsule against Non-Alcoholic Fatty Liver Disease in Rats

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Background: Non-Alcoholic Fatty Liver Disease (NAFLD) is an asymptomatic disorder that is characterized by the accumulation of excessive fat (triglyceride) in hepatocytes without significant alcohol consumption. Novel herbal medicines are tested for NAFLD due to high prevalence and lack of effective treatment. Carbon tetrachloride (CCl_4) is a common model used in studies on hepatotoxicity. A single dose of CCl_4 at 1mL/kg is known to be responsible for developing a centrilobular necrosis and fatty changes in rat liver. Alanine Transaminase (ALT) is a better maker of steatosis in rats.

Objective: To evaluate the effect of a capsule made from *Osbeckia octandra* plant extract by Fairway Biotech (Pvt) Ltd, against NAFLD in Wistar rats

Methods: Twelve male Wistar rats with elevated liver parameters were divided into two groups (n = 6) and the test group was treated with *Osbeckia octandra* capsule (16.67 mg/kg) for 14 days as a preliminary study to evaluate the effect of capsule on liver abnormality. In proper study, thirty new male Wistar rats were divided into five groups (n = 6). A single dose of CCl_4 (1 mL/kg body weight in 1:1 in olive oil) was used to induce NAFLD. Normal, vehicle, disease control, therapeutic and preventive group were respectively treated with distilled water, olive oil, only CCl_4, CCl_4-followed by capsule (7 days) and capsule (7 days) followed by CCl_4. Serum levels of transaminases (ALT, AST), Alkaline phosphatase (ALP), Gamma glutamyl transferase (GGT) and total protein were assessed on 1st, 7th and 10th day.

Results: Serum levels of AST and ALT were significantly reduced to normal level in preventive and therapeutic ($p < 0.05$) groups proving the efficacy of the tested capsule. Levels of GGT too have reduced. Elevated ALP level is indication of bone mineralization of young rats. No significant difference in total protein was observed.

Conclusion: *Osbeckia octandra* capsule exerts significant preventive and therapeutic effects against NAFLD in Wistar rats.

Keywords: Alanine transaminase, Alkaline phosphatase, Aspartate transaminase, Gamma glutamyl transferase, Non alcoholic fatty liver disease

OP 05

The Prevalence of Hyperlipidemia and Association of Dietary Habits with Lipid Profile Parameters in Final Year Undergraduates of University of Sri Jayewardenepura

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Background: Hyperlipidemia is becoming a burden to the adult population of the world especially, in middle income and low-income countries like Sri Lanka. Mainly undergraduates of all universities badly practice unhealthy dietary patterns and the risk for having hyperlipidemia can be increased with time.

Objective: To determine the association of dietary habits with lipid profile parameters of final year undergraduates of the University of Sri Jayewardenepura

Methods: A cross-sectional study was carried out among 71 final year undergraduates aged 24-27 years from the University of Sri Jayewardenepura. Socio-demographic characteristics and dietary data of all participants were collected, using a self-administered questionnaire. Total cholesterol, triglyceride and high-density lipoprotein (HDL) levels of all participants were analyzed by MISPA VIVA semi-automated analyzer after taking 3 mL of 12-hour fasting blood sample. Low-density lipoprotein (LDL) levels were calculated by the Friedwald equation. Dietary fat and cholesterol were calculated using Nutrisurvey software. Data analysis was done using the Pearson correlation. The cut-off levels published in the 3rd report of National Cholesterol Education Programme (NCEP) were used to interpret the lipid profile parameters.

Results: There were 47 of females and 24 of males in the study population. The prevalence of hyperlipidemia was 19.71%. The percentages of subjects with hypercholesterolemia, hypertriglyceridemia, low HDL level and high LDL level in the population were 5.63%, 2.81%, 61.97% and 19.71% respectively. There were statistically significant associations of dietary fat with total serum cholesterol ($r = 0.59$, $p = 0.001$), triglyceride ($r = 0.33$, $p = 0.005$), LDL ($r = 0.54$ $p = 0.001$), very low-density lipoprotein (VLDL) ($r = 0.33$, $p = 0.004$) and total cholesterol/HDL ($r = 0.32$, $p = 0.006$). There were statistically significant associations of dietary cholesterol with total serum cholesterol ($r = 0.73$ $p = 0.001$), triglyceride ($r = 0.30$, $p = 0.002$), LDL ($r = 0.68$, $p = 0.001$),VLDL ($r = 0.40$, $p = 0.001$) and total cholesterol/HDL ($r = 0.40$, $p = 0.001$).

Conclusions: A significant proportion of final year undergraduates had hyperlipidemia. The dietary habits of final year university students have a significant effect on lipid profile parameters.

Keywords: *Cholesterol, Hypercholesterolemia, Hyperlipidemia, Hypertriglyceridemia, Triglyceride*

OP 06

Association between Learning Environment and Perceived Stress among Nursing Students: A Cross-Sectional Study

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Background: Learning environment includes classroom learning, skill practice and clinical learning, could be identified as one of the key sources of perceived stress among nursing students.

Objective: To assess the association between learning environment and perceived stress among nursing students

Methods: A cross-sectional study was conducted among a convenient sample of 340 second-year and third-year nursing students from a School of Nursing, Sri Lanka. A self-administered questionnaire, consisting of socio-demographic data, Perceived Stress Scale-10 (PSS-10) and Dundee Ready Education Environment Measure (DREEM) were used. Descriptive statistics, Mann-Whitney U test, Kruskal-Wallis H test and Spearman correlation test were used in data analysis.

Results: The sample consisted of 311 females (91.5%) and 29 males (8.5%). The mean ($\pm$SD) scores of PSS-10 and DREEM were 20.09 ($\pm$5.33) and 133.04 ($\pm$12.97) respectively. Around 78% and 12% students showed moderate (score =14-26/40) and high stress levels (score $\geq$ 27/40). Nearly 92% of students reported learning environment as "more positive than negative" (score =101-150/200). The sub-domains of "academic self-perception" and "perception of atmosphere" in the DREEM showed the highest (70.13%) and the lowest (62.08%) scores respectively. Perceived stress was associated with learning environment (r = -0.111, p = 0.04) and sub-domain of "academic self-perception" (r = -0.196, p <0.01). A significant difference in PSS-10 score was reported across the different reasons for selecting nursing as a career choice (H = 23.27, p <0.001). Significant differences in the DREEM score were reported depending on gender (U = 3214.50, p = 0.01), academic year (H = 57.31, p <0.001) and reasons for selecting nursing as a career choice (H = 9.30, p = 0.03).

Conclusions: Nursing students experienced moderate to high levels of stress as well as positive learning environment. The learning environment was negatively related to perceived stress. Strategies are recommended to reduce the stress of nursing students. Reason for selecting nursing as a carrier choice is an important factor of perceived stress and perception of learning environment among nursing students; therefore, these aspects can be incorporated to student recruitment.

Keywords: *Learning environment, Nursing students, Perceived stress, Sri Lanka*

OP 07

Association of Taste and Smell Changes with Dietary Practices among Pregnant Mothers Attending the Antenatal Clinic in Teaching Hospital, Mahamodara

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Background: Taste and smell changes are found to be very common at the early stage of pregnancy and gradually reduced at the late pregnancy. Physiological and hormonal changes may lead to these changes. Taste and smell changes influence on dietary practices in pregnancy affecting nutritional status of pregnant women and consequently on maternal and fetal health.

Objectives: To identify the changes in taste and smell and its association with dietary practices among pregnant mothers attending the antenatal clinic in Teaching Hospital, Mahamodara (THM)

Methods: This study was a hospital based descriptive cross-sectional study with 320 pregnant mothers of less than 20 weeks of gestation who attended antenatal clinics in THM. The data were collected using a pre-tested, interviewer-administered questionnaire. Data were analyzed using SPSS version 25.0. Chi-square test was used to identify the associations.

Results: Taste and smell changes were reported among 76.9% and 87.8% mothers respectively. Eleven food categories associated with taste and smell changes were identified. Mostly reported taste change was observed for sweets (53.8%) followed by short-eats (42.2%), beverages (41.9%) and consumption of these food had increased. Mostly reported smell change was observed for fish (52.8%) followed by fruit juice (44.1%) and rice (42.5%) and their consumption had decreased. There was a significant association of consumption of dairy products, sweets, fruit juice, vegetables, green leaves, short-eats, starchy foods, animal food with the taste and smell changes ($p < 0.05$). There was no statistically significant association between taste changes and intake of fruits ($p = 0.18$) and smell changes and intake of beverages and grains ($p > 0.05$).

Conclusions: The taste and smell changes were observed among majority of the pregnant mothers attending to antenatal clinics at THM. It was significantly associated with dietary practices which need to be taken into consideration to meet their daily nutritional requirements.

Keywords: *Dietary practices, Pregnancy, Smell changes, Taste changes*

OP 08

First Year Nursing Students' Adjustment to the New Learning Environment at Government Nursing Schools in Sri Lanka as Percieved by Nursing Educators

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Background: Adjustment to the college as a freshman is crucial for the future academic progress, for a successful career and for life of an individual. To be an effective nurse in the future, the students should enjoy the optimal level of mental and physical well-being, spiritual sense of serving the society, best practice of study and work. The situation of schools of nursing reveals students drop rate as 7.5%, 5.3%, 17.4% and 1.5% respectively in schools of nursing Ampara, Batticaloa, Jaffna and Vavuniya which is higher compared to the drop rate of nursing students in all over the country (1.5%) during past six years. Thus, understanding context-based extent of the educational, social and psychological adjustment of first year students to life in nursing school is both timely and necessary.

Objective: To explore the perception of nursing educators on first year nursing students' adjustment to the new learning environment at Government nursing schools in Northern and Eastern provinces

Methods: A qualitative phenomenological study was used. In-depth interviews were conducted with purposively selected nursing educators (n = 8) in school of nursing Ampara, Batticaloa, Jaffna and Vavuniya, using a semi-structured interview guide. Data were analyzed by qualitative content analysis.

Results: Categories identified were clinical practice, theoretical training, social life and personal traits. The themes for clinical practice were sources of stress from trainer, nurses, other clinical staff and theory practice gap. The themes under the theoretical training category related to trainer, own and other students. Themes for social life category included accommodation, school life and relationships of the school. Lastly, themes for personal traits were self-confidence, controlling emotions and health problems.

Conclusions: It was found that both internal and external factors influence on nursing students' adjustment to the new learning environment. Continuous learning support, supervision and socialization programs needed to be strengthened in nursing school environment and in the clinical learning environment for the beginners.

Keywords: *Government nursing school, Learning environment, Nursing students, Nursing educators*

OP 09

Influence of Pre-Operative Health Education Sessions on Improving the Knowledge of Therapeutic Interventions among Patients Awaiting Coronary Angiography at the Sri Jayewardenepura General Hospital, Sri Lanka

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Background: Cardiovascular diseases (CVDs) are a leading cause of global deaths, and Coronary Artery Disease (CAD) is the most common type. An effective, invasive, diagnostic coronary angiography is a widely used tool and recommended for many of CAD patients.
Anxiety associated cardiac complications such as elevated blood pressure, tachycardia and arrhythmias can be reduced by pre-operative education on therapeutic intervention and will bring better health outcome. Also, health education will improve the quality of life by escalating adherence to medical and surgical management.

Objective: To assess the influence of pre-operative health education sessions for improving knowledge on therapeutic interventions among patients who are preparing for coronary angiography

Methods: A total number of 150 patients who were awaiting coronary angiography at Cardiology Unit in Sri Jayewardenepura General Hospital were included in the study. A pre-tested interviewer administered questionnaire was administered (pre-test) to the patients. Later an educational session was conducted for 30 minutes by the researcher focusing on improving the knowledge on therapeutic intervention. After the education session the same questionnaire was administered (post-test). Both questionnaire and education session were developed by the researcher using scientific literature.

Results: Among the participants, 98% were married and 64.7% were males. The majority was in 51-60 years old age range. The level of knowledge before and after the educational sessions were varied regarding the main procedure of angiography (pre- 39.3%, post- 100%), importance of blood investigations (pre- 39.3%, post-100%), surgical site (pre- 20.7%, post-94.7%) and importance of post hydration (pre- 38.7% post- 92%). A significant difference was seen between pre and post knowledge of the patients participated in the study ($p < 0.001$).

Conclusion: Health education sessions are effective in improving the level of knowledge on coronary angiography among patients who are waiting for coronary angiography. Pre-operative health education sessions need to be encouraged to improve the better health outcome of the patient by minimizing the level of anxiety.

Keywords: Coronary angiography, Health education, Knowledge

OP 10

Knowledge, Attitudes and Practices Regarding Management of Methicillin Resistant *Staphylococcus aureus* among Intensive Care Unit Nurses in National Hospital, Sri Lanka

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Background: Methicillin resistant *Staphylococcus aureus* (MRSA), is resistant to beta-lactam antibiotics. Infections with MRSA increases the mortality of patients greater than due to infections with methicillin sensitive *Staphylococcus aureus*. Healthcare workers seems to be a main mode of spreading MRSA within healthcare systems.

Objectives: To assess knowledge, attitudes and practices among Intensive Care Unit (ICU) nurses at National Hospital of Sri Lanka (NHSL) regarding the managment of MRSA

Methods: A descriptive cross-sectional study was conducted in 14 ICUs in NHSL, among 265 nurses. A pre-tested, self-administered questionnaire was used to collect data. Descriptive statistics and Chi-square test was performed for data analysis using SPSS version 24.

Results: Majority were females (87.2%), Sinhalese (98.9%) and married (62.6%). Majority have been educated up to diploma (82.6%) and 68.7% were in nursing grade III. The 69% had working experience of less than 10 years. Findings revealed that 52% nurses are having very good knowledge, 87% are having very good practices and 43.3% are having moderate attitudes regarding MRSA management. Majority knew, MRSA is a gram positive bacterium and hand hygine is the most important measure in disease prevention. Two third (65%) accepted that healthcare providers are highly involved in disease spreading. Around 72% was aware on treatment of MRSA skin carriage with topical or oral antibiotics. Awareness on barrier nursing was satisfactory among 77%. The 62% were aware of importance of personnel protective equipment and dedicated equipment in patient care. There was a significant relationship between knowledge on MRSA with grade ($p = 0.02$) and years of experience ($p = 0.01$).

Conclusions: Knowledge and practices regarding MRSA among ICU nurses at NHSL was satisfactory and the knowledge was directly influenced by the yeasrs of experience and grade.

Keywords: Attitudes, ICU nurses, Knowledge, MRSA, Practice

OP 11

Relationship between Emotional Intelligence and Job Satisfaction among the Nursing Officers in General Hospital, Kalutara

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Background: Emotional Intelligence (EI) and Job Satisfaction (JS) are two critical elements in the Nursing profession. Therefore, proper identification of these characteristics is important to upgrade the nursing service.

Objective: To evaluate the relationship between EI and JS among nursing officers in General Hospital, Kalutara

Methods: A descriptive cross-sectional study was conducted among a sample of 205 nursing officers working in General Hospital, Kalutara selected with systematic random sampling. Demographic data were assessed using a pre-tested, self-administered questionnaire. The levels of EI and JS were evaluated using cross-culturally adapted, pre-tested, 33-item Schutte Emotional Intelligence Test and 37-item ESET Job Satisfaction questionnaire, respectively. The pre-test was conducted in the University Hospital, Kotelawala Defense University. Pearson correlation and Chi-square test were used to evaluate the relationships among variables.

Results: A weak positive correlation was found between the EI and JS ($r = 0.24$; $p < 0.01$). Three of the four dimensions in Schutte EI scale were 'good' while one dimension was 'moderate'. Two dimensions have scored as 'satisfied' while four dimensions have scored as 'moderately satisfied' out of the six dimensions in the ESET scale. There was a significant correlation between EI and monthly income ($r = 0.152$; $p = 0.043$). Demographic variables such as age, working experience and total duty shifts had no association with EI and JS ($p > 0.05$). However, there was a strong correlation between the dimension "organizational resources" and the dimension "leadership" ($r = 0.72$; $p < 0.001$). Further, an association was found between one of the EI dimension "utilizing of emotions" with working experience ($p = 0.01$).

Conclusions: A weak positive correlation was found between the EI and JS among the nursing officers in General Hospital, Kalutara. Enhancement of JS through continuous evaluation and implementation of EI developing programmes in the hospital are recommended.

Keywords: Emotional intelligence, Job satisfaction, Nursing officers

OP 12

The Quality of Life of Mothers of Children with Congenital Heart Diseases: A Descriptive Cross-Sectional Study

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Background: Congenital Heart Diseases (CHD) is the commonest of all congenital defects and the highest prevalence is reported in Asia which is 9.3 per 1,000 live-births. Having a child with CHD may cause high level of stress and very poor quality of life (QOL) for their parents and it will directly affect the wellbeing of the child.

Objective: To determine the QOL of mothers of children with CHD

Methods: A descriptive cross-sectional study was conducted among 75 mothers, who seek treatments for a child with CHD at the cardiology clinic, Lady Ridgeway Hospital for Children, Sri Lanka. The World Health Organization QOL (WHOQOL)-BREF was used to measure the QOL. Data were analysed according to the WHOQOL-BREF manual using descriptive statistics. IBM SPSS version 25 was used as the statistical analysis tool.

Results: Nearly two-thirds of mothers of children with CHD (64%) belonged to 30–39 age group. The majority were Sinhalese (85.7%) and Buddhists (73.3%). Of the participants, 52% had received education up to the senior secondary level and 57.3% were not engaged in any paid work. Only 29% of mothers found to have good overall QOL. Physical and social relationship domains of QOL were good among 55% and 43% of mothers respectively. The psychological and environmental domains were good only in 32% and 28% of mothers respectively.

Conclusions: Overall QOL among most of the mothers of children with CHD were poor. Psychological and environmental domains affected more than the other two domains. Interventions to improve the QOL of the mothers of children with CHD by focusing on the psychological and environmental domains need to be implemented.

Keywords: Children, Congenital heart diseases, Quality of life, Mothers

OP 13

Use of Internet and eHealth literacy Skills among Nursing Students in a Selected Government School of Nursing, Sri Lanka

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Background: Nurses need to have skills in finding, understanding and applying health information available online platforms into their practice. The development of these skills among nursing students is an essential component of nursing education.

Objective: To examine the use of internet and eHealth literacy skills among nursing students in a selected Government School of Nursing, Sri Lanka to plan interventions to improve their competency in eHealth literacy

Methods: A cross-sectional survey was conducted among a purposive sample of nursing students (n = 440) from a conveniently selected Government School of Nursing, Sri Lanka. A pre-tested self-administered questionnaire, consisting of demographic information, use of internet and eHealth literacy skills was used. eHealth literacy skills were assessed by eHealth literacy Scale (Norman and Skinner, 2006). In statistical analysis, descriptive statistics, the Mann-Whitney U test, and Kruskal-Wallis H test were used.

Results: The sample consisted of 95.5% (420) females and 4.5% (20) males, and the age range was 21 to 30 years. The 47% reported good self-rated internet use skills. The primary device used to access the internet was smart phones (97.3%). Internet was mainly used for study purposes (99.1%), and these included doing assignments (92%), improving health-related knowledge (72.7%) and preparing for examinations (39.2%). The majority perceived that the internet was useful in health decision making (68%) and important in accessing health resources (72%). The mean eHealth literacy score was 28.02 (SD $\pm$ 4.60), and 51.6% reported adequate eHealth literacy skills. The factors associated with eHealth literacy were self-rated internet use skills ($p = 0.005$), perception on use of internet in health decision making ($p = 0.009$) and accessing health information ($p = 0.001$).

Conclusions: Internet is popular among nursing students, particularly for educational purposes. Students held positive perception towards the use of internet in accessing health information and health decision making. Half of the nursing students have adequate eHealth literacy skills. There was a positive association between perception towards and good skills in internet use with eHealth Literacy skills. Internet-based educational strategies can be integrated into nursing education.

Keywords: *eHealth literacy, Internet, Nursing students, Sri Lanka*

OP 14

Evaluation of *in-vitro* Antiurolithiatic Potential of Ethanol, Hexane, and Aqueous Extracts of *Aegle marmelos*

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Background: Medicinal plants have been extensively studied for their various biological activities and therapeutic potentials including antiurolithiatic potential. Calcium oxalate (CaOx) is the predominant component of most stones that are deposited in the urinary system. Formation of these stones is a multi-step process which includes super saturation, nucleation, aggregation, growth and retention. *Aegle marmelos* is commonly used by the ayurvedic medical practitioners in the treatment of urolithiasis.

Objectives: To determine the effect of ethanol, hexane and aqueous extracts of *Aegle marmelos* (Beli mal) against CaOx urolithiasis *in-vitro*

Methods: Three extracts of *Aegle marmelos* were analyzed for *in-vitro* antiurolithiatic activity using nucleation, aggregation and growth assays. Optical density of reaction mixture was measured spectrophotometrically. Each test was carried out in duplicate. Type of crystals formed was observed under a light microscope. Preliminary phytochemical screening was performed.

Results: The results demonstrate that *Aegle marmelos* has the capacity to inhibit the nucleation, growth and aggregation of CaOx crystals. In nucleation assay, microscopic examination of crystals revealed the presence of more calcium oxalate monohydrate crystals than calcium oxalate dihydrate crystals. Also, a reduction of the number of crystals was observed in the presence of plant extracts compared to the control. Both ethanol and hexane extracts showed significantly higher inhibition compared to the standard drug, Cystone ($p \leq$ 0.05) but the maximum percentage of inhibition was shown by hexane extract of *Aegle marmelos* at 1000 µg/mL (83.56 ±0.06%). In the growth and aggregation assays, all extracts showed significant inhibitions but aqueous extract of *Aegle marmelos* showed the maximum inhibition against CaOx crystal growth and aggregation, at 1000 µg/mL (75.76%, 50.13% respectively). Aqueous extract revealed the presence of reducing sugars, proteins, anthracene glycosides and saponins.

Conclusions: This study has proven the *in-vitro* antiurolithiatic potential of *Aegle marmelos* against CaOx urolithiasis. Since maximum inhibitory activity was shown against both growth and aggregation of CaOx crystals, aqueous extract of *Aegle marmelos* has higher antiurolithiatic potential compared to other two extracts.

Keywords: Aegle marmelos, Calcium oxalate, Nucleation, Urolithiasis

OP 15

Formulation and Evaluation of Herbal Sunscreen Lotion Employing *Clitoria ternatea* Floral Extract as Active Ingredient

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Background: Intermittent exposure to solar UltraViolet (UV) radiation is considered to increase the risk of photo-dermal pathogenesis. Herbal extracts and herbal cosmeceuticals rich with flavonoids have proven their effectiveness as UV filters in terms of absorption, scattering, reflection of UV photons and due their free radical scavenging activity. *Clitoria ternatea* (*C. ternatea*) (Katarolu) is a plant known for its versatility in therapeutic and cosmeceutical applications.

Objective: To formulate and evaluate herbal sunscreen lotion employing floral extract of *C. ternatea* as UV filter

Methods: *In-vitro* photo protective property of freeze-dried floral extract of *C. ternatea* and lotion were determined according to the Mansur equation and expressed in terms of Sun Protection Factor (SPF). Antioxidant capacity of crude extract was determined using Nitric Oxide (NO) Radical Scavenging Assay with minor modifications. Total antioxidant capacity of the plant extracts and optimized formulation were determined using DPPH assay with minor modification.

Results: Solution containing 0.2 mg/mL of freeze-dried floral extract showed SPF value of 20.49 ±1.04. Percentage of NO radical scavenging capacity of floral extract (1 mg/mL) was 40.37 ±5.47 with respect to 92.24 ±6.54 obtained for positive control. DPPH radical scavenging capacity of floral extract was 1418.25 ±125.89 mg ascorbic acid equivalents/100 g dry weight. SPF of optimized formulation was 21.38 ±0.77 and total antioxidant capacity of optimized formulation was 571.82 ±116.29 mg ascorbic acid equivalent/100 g of optimized formulation.

Conclusions: Floral extract of *C.ternatea* and optimized sunscreen lotion containing the floral extract have demonstrated significant photo protective and antioxidant capacity. Hence chemical UV filters with inherent toxicities can be successfully replaced with the *C. ternatea* floral extract.

Keywords: *Antioxidant, Clitoria ternatea, Lotion, Nitric Oxide, Sun Protection Factor*

OP 16

Formulation of a New Herbal Soap Based on a Traditional Herbal Recipe of Medicinal Plants in Sri Lanka

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Background: Herbal soaps based on traditional recipes with proven qualities are not readily available in Sri Lankan market. Hence, the current study was aimed to formulate a new herbal soap with specific qualities using an extract of traditional herbal recipe.

Objectives: To formulate a new herbal soap using a traditional herbal recipe containing *Santalum album*, *Curcuma longa, Coscinium fenestratum, Rubia cordifolia, Glycyrrhiza glabra, Kokoona zeylanica, Hemidesmus indicus, Cassia auriculata* and *Azadirachta indica* and to evaluate its properties

Methods: Methanol, ethyl acetate and hexane extracts of herbal mixture were obtained by soxhlet extraction and each extract was tested for antioxidant potential using Folin – Ciocalteu method, aluminium chloride method and DPPH assay. The extracts were also screened for antimicrobial activity using well diffusion method carried out against *Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa* and *Candida albicans*. The most active methanolic extract was used to formulate soaps with different extract concentrations and tested for antimicrobial activity against the selected microorganisms by disc diffusion method using Dettol and Ketaconozole as positive controls. Herbal soap with the highest antimicrobial activity was further tested for pH, Total Fatty Matter (TFM) and moisture content.

Results: Methanol extract with the highest total phenolic content (296.4 ±0.6 mg GAE/g), total flavonoid content (714.47 ±0.39 mg CE/g) and the lowest IC_{50} value (0.398 ±0.051 mg/L) has the highest antioxidant activity. It also exhibited a considerable antimicrobial activity against *S. aureus* and *C. albicans*. Herbal soap with the highest concentration of methanolic extract (1% w/w) exhibited the highest antimicrobial activity against *S. aureus* and *C. albicans* when compared to other samples and controls. The measured pH (10.5 ±0.1), TFM (69.8 ±0.6 %) and moisture content (16.0 ±0.2 %) for soap were found to be considerably acceptable.

Conclusion: The methanolic extract of selected traditional herbal recipe can be successfully used to formulate a herbal soap with improved antioxidant and antimicrobial activities for a healthy skin.

Keywords: Antimicrobial, Antioxidant, Herbal, Soap, Traditional

OP 17

Supplementation of Freeze-Dried Ivy Gourd Leaf Extract on Cardio-Vascular Risk Factors and Atherogenic Index in Patients with Newly Diagnosed Type 2 Diabetes Mellitus

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Introduction: Cardiovascular diseases (CVD) are the leading cause of morbidity and mortality in patients with type 2 diabetes mellitus (T2DM). Dietary and pharmacotherapeutic interventions to modify risk factors of CVD in patients with newly diagnosed T2DM are important. The cardioprotective activity of Ivy gourd; *Coccinia grandis* (L.) Voigt (Cucurbitaceae) has been proven in animal models of diabetes mellitus.

Objective: To determine the effect of supplementation of freeze dried powder of aqueous refluxed Ivy gourd leaf extract on body mass index (BMI), waist circumference (WC), atherogenic index (AI), cardio-protective index (CPI) and coronary risk index (CRI) in newly diagnosed patients with T2DM

Methods: Seventy three newly diagnosed patients with T2DM aged 30-60 years were treated with newly developed herbal capsule of freeze dried powder of hot water leaf extract of Ivy gourd (500 mg) once daily for three months. Height, weight and WC were measured and fasting serum total cholesterol (TC), triglyceride, high-density lipoprotein cholesterol (HDL-C) and low-density lipoprotein cholesterol (LDL-C) were estimated at the baseline and at the end of three months. BMI and AI (TC-HDL-C/HDL-C), CPI (HDL-C/LDL-C) and CRI (TC/HDL-C) were calculated. Within group changes at the end of the intervention against baseline were compared using Wilcoxon signed-rank test. $p \leq 0.05$ was considered as statistically significant.

Results: The mean BMI and WC of study population were 25.46 kg/m^2 and 89.36 cm respectively. The treatment of Ivy gourd capsule led to significant reductions in mean BMI by 1.02% ($p = 0.019$), AI by 10.24% ($p = 0.006$) and CRI by 7.87% ($p = 0.006$) with significant increment of CPI by 9.43% ($p = 0.008$). There was no significant effect on WC upon the supplementaion of Ivy gourd.

Conclusion: The supplementation of Ivy gourd (500 mg per day) for three months improved the CVD risk factors and would be a therapeutic promise to modify CVD risk in patients with newly diagnosed T2DM.

Keywords: Atherogenesity, Cardio protection, Ivy gourd supplementation, Type 2 diabetes mellitus

OP 18

An Analysis of Coping Strategies for Managing Stress among Healthcare Professional Undergraduates of University of Ruhuna, Sri Lanka

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Background: University is the best platform which provides opportunities for undergraduates to develop their successful career. However, it is noticed that university life has become stressful for undergraduates due to different reasons. Stress is known as a serious issue which affects the performance of undergraduates of healthcare system. Coping strategies are in demand for managing stress in the context of delivering prudent healthcare professionals to the nation.

Objectives: To identify the types of stressors and evaluate the coping strategies among healthcare professional undergraduates of University of Ruhuna, Sri Lanka

Methods: The study was based on a cross-sectional survey. Data were collected from 343 healthcare professional undergraduates from Faculty of Medicine and Faculty of Allied Health Sciences having used stratified random sampling method and a self-administered structured questionnaire. Data were analysed using SPSS version 16.

Results: The study revealed that majority of the undergraduates (98.8%) were affected by stress. The level of stress reported was very high regarding examinations (52.7%) than the other stressors. Results showed that the commonly practiced coping strategies were sleeping (93.6%) followed by talking to a friend/meeting loved ones (89.8%). Considerable number of participants used alcohol intake (51.9%), smoking (50.4%), illicit drug intake (50.1%) and sexual activities (49.6%) for coping with stress. Results suggested that facilities rendered by two faculties including student counselling services (79.9%), mentoring programme (75.8%) and career guidance services (69.4%) were used by considerable number of undergraduates as coping strategies. There were statistical significant differences among coping strategies with regard to gender, year of study, faculty and degree programme.

Conclusions: Healthcare professional undergraduates have high levels of stress mainly caused by academic related sources. Majority of the undergraduates managed to use good coping strategies. However, considerable amount of undergraduates engaged in maladaptive coping strategies that could give serious consequences for their lives.

Keywords: *Coping strategies, Healthcare professional undergraduates, Stress, Stressors, University*

OP 19

A Study on Level of Depression among Senior Citizens in Aged Care Centres in Gampaha District, Sri Lanka

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Background: Depression is a prevalent but severe mood disorder that requires therapy. Sri Lanka is one of the world's fastest-aging nations. It is anticipated that, this fast demographic transition will lead to an elderly population of one quarter by 2041. As a consequence, the nation will face profound difficulties, particularly in planning of appropriate elderly-oriented facilities in social care and healthcare industries. In reaction to this need, many initiatives have been introduced to support and safeguard elderly people's welfare.

Objective: To assess the level of depression among senior citizens in aged care centers in Gampaha District

Methods: Institution-based descriptive cross-sectional study was conducted among 212 senior citizens aged between 60-80 years in randomly selected six aged care centers in Gampaha District. Convenient sampling method was used to select respondents. Informed consent was obtained prior to study. A self-administered questionnaire was used. Depression was assessed using modified and culturally adapted Geriatric Depression Scale (Short Form) (GDS). According to GDS scores, 0 to 4 suggests normal (no depression), 5 to 8 suggests mild depression, 9 to 11 suggests moderate depression, 12 to 15 suggests severe depression. Data were analyzed using Excel and Statistical Package for Social Sciences (SPSS) version 20.

Results: The study consisted 157 females (74.1%) and 55 males (25.9%). Depression indicated from the GDS was observed in 146 participants out of the whole 212 study population. In this study, 66 participants had no depression while 118 had mild depression, 27 had moderate depression and one had severe depression. Around 18.9% (n = 40) of the participants had the score of 5 of the study population.

Conclusion: The majority of the inmates in the aged care centers was having symptoms suggestive of mild depression.

Keywords: Aged Care, Depression, Senior citizens, Sri Lanka

OP 20

Do Human Relationships Play a Role to Change the Perception of Drug Addicts in Rehabilitation?: A Qualitative Study

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Background: Drug addiction has become a major health issue, specificaly, among young people in Sri Lanka. Family, peer and other social relationships are found to be closely associated with substance use behavior in young people. Very little evidence exists on how healthy relationships with close relatives and people in the community influence recovery rates of drug addicts.

Objectives: To explore the beliefs and views of young drug addicts in a rehabilitation centre in Southern Sri Lanka about associations between impact of human relationships and psychological status of drug addicts in rehabilitation

Methods: A qualitative phenomenological study was carried out in a drug rehabilitation centre in Galle. Twenty participants who were addicted to drugs for more than one year and currently on rehabilitation were invited to participate in the study. Semi structured, in-depth interviews were carried out. Thematic analysis method was used to analyze the data.

Results: The mean (±SD) age of the participants was 33 (±6.77) years, and the mean duration of substance use behavior was 10.57 (±6.59) years. Participants were on the opinion that poor family and peer relationships, and psycho-social trauma that they had to experience during childhood were the main causes for initiation of drug use. Affection and forgiveness from parents, strong romantic desires from partners, love from offsprings, and generocity from peers were the major themes emerged that would assit them to rebuild broken relationships and to have fast and sustainable recovery rate.

Conclusions: Development of healthy relationships seems to play a vital role in drug rehabilitation process. Rehabilitation strategies need to identify mentality of close relatives of the victims, possibilities to join them in some part of the rehabilitation process and continues follow-up both parties for effective results.

***Keywords:** Drug addiction, Human relationships, Qualitative approach, Rehabilitation*

OP 21

Effectiveness of the Non-Pharmacological Rehabilitation Interventions on Abstinence of Psycho-Active Substance Abuse: A Systematic Review

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Background: Nearly 75% of individuals who completed existing rehabilitation programmes in Sri Lanka reported relapses of substance use disorder. The abundance of effective Non-pharmacological interventions to treat substance abuse disorder has solidified globally. Improving the prevailing treatment systems would undoubtedly benefit not only affected individuals but also their families and society.

Objective: To explore existing effective non-pharmacological rehabilitation interventions on the abstinence of substance abuse disorders

Methods: A systematic review was conducted according to the PRISMA guidelines. PubMed, HINARI, Google Scholar and the Cochrane databases were systematically searched to identify articles and duplications were removed using EndNote. Topics and abstracts of the articles were screened for eligibility. Articles of empirical studies on non-pharmacological rehabilitation interventions which were published in peer-reviewed journals during 2015-2020, written in English, were included and articles on alcohol and smoking cessation and rehabilitation interventions for children (<18 years) were excluded from the review. Full papers were then assessed against eligibility criteria. Quality appraisal and data extraction of the selected articles were performed by two independent reviewers and discrepancies were discussed with another independent reviewer to reach consensus.

Results: Through the comprehensive database search, 307 articles were identified. After screening the topics and abstracts of the articles and assessing the relevant full texts for eligibility, 22 articles of the empirical studies were included in the systematic review. Vigorous regular exercise, mindfulness-based relapse prevention, therapeutic alliance in substance use disorder (Narcotics Anonymous), multi-dimensional family therapy, distress tolerance treatment, neurobehavioral treatment, therapeutic workplace, patients are paid to perform jobs or to participate in job training, web-based behavioral treatment (therapeutic education system), and video game-based exercise programs were found to be significantly effective on abstinence of substance abuse.

Conclusions: There were strong empirical evidence of effective non-pharmacological rehabilitation interventions and the combination of treatment interventions are thought to be more effective against substance abuse.

Keywords: *Abstinence, Non-pharmacological rehabilitation interventions, Substance abuse disorder*

OP 22

Prevalence and Influencing Factors of Depressive Symptoms among Adolescents in a Rural Area, Sri Lanka

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Background: Adolescence is a transitional stage of physical and psychological development that normally occurs during the period from childhood to adulthood. Due to the physical, social and psychological changes as well as educational stresses, adolescents are more prone to develop stress and depression.

Objective: To assess the prevalence and influencing factors of Depressive Symptoms (DS) among adolescents in a rural area

Methods: Nine schools were selected in the Dehiowita Educational Zone, Sabaragamuwa, Sri Lanka. Convenient sampling method was used. Students aged 15-17 years in Grade 10, 11, 12 were assessed using the Sinhala version of the Patient Health Questionnaire (PHQ-9) and self-administered questionnaire used in previous studies, Sri Lanka. Data were analyzed using MS Excel and SPSS version 20.

Results: The mean ($\pm$SD) age of the students was 16.8 ($\pm$0.4) years. Sample (n = 270) consisted of 59% females. Among the respondents, 52% had DS. Out of them, 57% had mild DS, 28% had moderate DS, 12% had moderately severe DS and 4% had severe DS. Female students were more prone to get DS (2.01 $\pm$1.06) than male students (1.33 $\pm$0.90; p = 0.003). DS was significantly associated with broken close relationship (p = 0.02), financial problems in the home (p = 0.03), different harassments such as physical, mental, verbal or sexual (p = 0.01), and exposure to violence (p = 0.002).

Conclusions: A considerable proportion of adolescents in this rural area had DS. They need mental health assistance to face broken close relationships, financial problems, different harassments and violence. The awareness programmers for parents and students (school-based mental health literacy programs) and early help-seeking from professionals should be improved and recommended.

Keywords: Adolescents, Depression, Influencing factors, Prevalance, Rural area

OP 23

Sexual Life of Male Stroke Patients

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Background: Sexual dysfunction in stroke survivors is common. However, it is an under-recognized complication. Sexual dysfunction is more common among male patients with stroke and 50% or more of stroke survivors are suffering from sexual decline in post-stroke period. Sexual health issues of stroke patients are neglected by the partners as well as health care professionals during the patients′ rehabilitation period.

Objective: To explore the experiences of sexual activities after a stroke attack in men

Methods: In this phenomenological study, 20 males who were aged between 35-55 years with at least six-month period of post-stroke, visited the physiotherapy and occupational therapy departments at Rehabilitation Hospital, Ragama, were purposively recruited for the study. Semi-structured interviews were conducted to collect data and thematic analysis was conducted.

Results: Three main themes were identified; disease priority rather than sexuality, stroke-related sexual inability and deviation of sexual bond with a partner. A priority for the disease rather than sexuality is mostly seen because of thinking of physical disabilities. Patient and partner is giving more attention to the recovery process of stroke and both of them have fear and stress. Stroke-related sexual inability is common due to erectile dysfunction, inability to tolerate sexual position and problems of ejaculation. Deviation of sexual bond was seen due to the changing relationship with the partner, feeling of loneliness and busy schedule of the partner with all households.

Conclusions: Male patients with stroke faced various physical and psychological difficulties in sexuality. Eventhough, they can engage in sexual activities, thier sexual bond had been deviated since their partners were busy. It is recommended to have supportive interventions such as educating both the patients and the partners to enhance the sexual bonds for improving the quality of life after the stroke.

Keywords: Experiences, Male patients, Sexuality, Stroke

OP 24

Social Media, Family Relationships and Bullying Behaviour in School Children: A Cross-Sectional Study in Galle, Sri Lanka

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Background: School bullying has been identified as a major public health problem worldwide. Bullying can have negative consequences on both the bullies and bully victims. School bullying still remains as a hidden public health issue in Sri Lanka.

Objectives: To assess the relationships between bullying behavior, family relationship and usage of social media among early adolescent school children in Galle municipality area

Methods: A descriptive cross-sectional study was conducted in six selected schools in Galle municipal area with 576 students from grade 7, grade 8 and grade 9 classes. Adolescent Peer Relationship Scale which was validated in Sri Lanka was used to assess bullying behavior and victimization. Data were analyzed by SPSS version 25.

Results: Mean (±SD) age of the study participants was 12.9 (± 0.84) years. Overall prevalence of bullies and bully victims were 3.8% and 92.3% respectively. Percentage of males and females who exposed to bullying were 96.7% and 93.8% respectively. Although the majority (n = 304) were not exposed to usage of any type of social media, all the students who used social media on daily basis had been involved in some form of bullying behavior. Higher the frequency of the use of social media higher the verbal and physical bullying involvements (p <0.05). Majority of children (n = 545) had good relationship with family members, but 96.3% of them were bullies whereas children who have poor and moderate relationship with family were more likely to be bully victims (p <0.05).

Conclusions: The usage of social media positively associated with bullying behavior in adolescent school children. Good family relationships does not seem to prevent bullying behavior of childern. Hence, it is essential to find in-depth personal and psycho-social reasons why bylliyng behavior is common in children.

Keywords: *Bullying, Family relaionship, Frequancy, Usage, Social media*

OP 25

The Effect of Flooding on Mental Health as Perceived by Parents and Students in a Selected Rural Community in Galle District: A Qualitative Study

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Background: Sri Lanka has two distinct monsoon seasons and commonly experiences seasonal flooding due to extreme rainfall. Particularly Southern region is more susceptible to flooding during South-West season. During the period of 2005–2015 floods affected 64% of the total population in Sri Lanka. Flooding can pose substantial social and mental health problems that may continue over extended periods of time. Qualitative data are crucial to a comprehensive understanding of the impact that floods have on the mental health of people affected and can be helpful in the design of policies and strategies to mitigate the impact of floods on mental health.

Objective: To understand the psychological burden of flood in a selected community in Tawalama area, Galle district

Methods: A qualitative study was conducted in flood affected area in Thawalama in Galle district. Four focus group discussions (FGD) with students (n = 36) and two with mothers (n = 13) were carried out to explore psychological burden after a flood. A pre-tested interviewer guide was used and data were collected until the point of saturation. Thematic analysis was used to analyze the data.

Results: The two major themes emerged; replaceable and non-replaceable and secondary stressors. Secondary stressors, such as disputes with insurance and construction companies, problems with personal relationships (at home, work and with friends), lack of understanding, economic problems and problems with employment, ultimately led to mental health problems. Replaceable and non-replaceable (loss of loved ones, loss of home and other personal possessions) as well as the resulting displacement had a strong impact on their mental health.

Conclusions: Flooding was a stressful experience and the stress continued for a long time even after water receded. Thus, providing long-term mental health support for affected individuals is important.

Keywords: Flood, Galle district, Mental health

Poster Presentations

PP 01

Assessment of the Effects of Delay in Separation of Plasma and Analysis, on Pre-Analytical Stability of Plasma Adrenocorticotropic Hormone

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Background: Adrenocorticotropic hormone (ACTH) is an unstable pituitary hormone circulated in very low concentrations in blood. Therefore, strict procedures are followed in plasma ACTH assay in current laboratory settings such as immediate refrigerated centrifugation and analysis after collection. But delay of sample analysis can occur due to unavoidable reasons at any time in practice. This study enables to expand the knowledge related to maximum acceptable time delay and effect of plasma separation for plasma ACTH assay to achieve a clinically acceptable test result.

Objectives: To investigate the in-vitro stability of human plasma ACTH until separation of plasma and acceptable time delay until sample analysis in chemiluminescence immunoassay (CLIA) platform at 2-8 ⁰C

Methods: Retained samples which were received for ACTH assay were obtained for the study (n = 8). Each sample was divided into two portions; A and B. Each protocol was done for time delays of 2 hours, 4 hours, 8 hours, 24 hours and 48 hours. In protocol A, whole blood was immediately centrifuged and plasma aliquots were stored at 2-8 ⁰C and analyzed at each time point. In protocol B, whole blood was divided into 5 aliquots and stored at 2-8 ⁰C, plasma was separated at each time point and analyzed. Sample aliquot analyzed at standard conditions was taken as baseline value for each sample. Percentage difference in ACTH value >10% was considered as clinically significant.

Results: It was noted that ACTH levels decreased with time in both protocols. However, the mean percentage differences of both protocols were <10% up to 8 hours after sample collection, and mean percentage differences of protocol A were less than that of protocol B. *p* values were >0.05.

Conclusions: This study shows that maximum acceptable time delay for plasma ACTH assay is 8 hours for both plasma and for whole blood at 2-8 ⁰C. However, immediately centrifuged and separated plasma is better than whole blood samples.

Keywords: ACTH, Analysis, Plasma separation, Preanalytical stability, Time delay

PP 02

Association of Serum Gamma Glutamyltransferase with Random Plasma Glucose and Body Mass Index in Selected Diabetic and Non-Diabetic Subjects

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Background: Gamma glutamyltransferase (GGT) is known as a predictor for several diseases such as metabolic syndrome, cardiovascular disease, liver diseases and alchol abuse. There is a strong association of obesity with hepatic insulin resistance. According to studies, Sri Lanka is among the countries with highest prevalence rates for diabetes in the world. Despite several studies reported worldwide, correlation between serum GGT and diabetes considering plasma glucose level and body mass index (BMI), are less supportive in Sri Lankan context.

Objective: To investigate the association of serum GGT in diabetics and non-diabetics and analyzed associations of GGT with random plasma glucose (RPG) and BMI in a selected Sri Lankan setting

Methods: A case control study was conducted with 147 subjects (n = 72; controls/healthy individuals, n = 75; cases/type 2 diabetics) between 20-60 years of age. Height and weight was measured and BMI was calculated. Venous blood (5 mL) was collected for serum GGT and RPG analysis and were estimated using semi-automated clinical analyzer. A subgroup analysis was conducted classifying subjects into two BMI subgroups (group 1: underweight, normal and group 2: overweight, obese).

Results: Serum GGT was significantly higher (p = 0.024) in diabetics (median GGT 21.11 U/L) than non-diabetics (median GGT 14.40 U/L). A significant positive correlation (r = 0.375, p = 0.001) was observed between serum GGT and RPG in cases. Serum GGT had no significant correlation with BMI in either cases or controls. Serum GGT was significantly higher (p = 0.007) in overweight subjects (median GGT 24.14 U/L) compared to underweight subjects (median GGT 10.91 U/L) in diabetics. In BMI subgroup analysis, group 2 in cases (median GGT 21.84 U/L) showed significantly higher (p = 0.048) serum GGT levels compared to group 1 (median GGT 16.05 U/L).

Conclusions: Elevated serum GGT level was associated with type 2 diabetes and GGT levels showed a positive correlation with plasma glucose levels. Higher seum GGT levels were associated with increased BMI in diabetics.

Keywords: Body mass index, Gamma glutamyltransferase, Random plasma glucose, Type 2 diabetes

PP 03

Microbiological Analysis of Bronchoalveolar Lavage Fluid of Patients Undergoing Bronchoscopy at Two Tertiary Care Hospitals in Colombo

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Background: Microbiological analysis of Bronchoalveolar lavage (BAL) fluid gives valuable information on pathogens responsible for associated diseases. This study was conducted to detect a broad group of microorganisms from BAL of patients with different pathologies and to identify possible associated factors for microbial infection/colonization of lower airways.

Objectives: To describe bacterial and fungal pathogens isolated from BAL to determine the association of selected factors with lower airway infection/colonization of patients undergoing bronchoscopy in two tertiary care hospitals in Colombo

Methods: A descriptive cross-sectional study was conducted during a two-month period including consecutive patients undergoing bronchoscopy. BAL fluid was subjected to microbiological examination. Association of microbiological findings with selected factors was determined.

Results: A total of 34 patients with chronic lung disease (9), lung malignancy (14) and ongoing infections (12) were included. Among 34 BAL samples, 25 (73.5%) samples yielded a possible/probable pathogen. Aerobic culture yielded bacterial pathogens in 17 (50%) samples. All were Gram-negative bacteria; *Pseudomonas* spp. and *Klebsiella* spp. 8 (44.5%) isolates each and 2 (11%) *Morexella catarrhalis* isolates. Antibiotic resistance was relatively low in these organisms. Fourteen (41.2%) samples were positive for a fungal growth and the commonest fungal pathogens were *Aspergillus* spp. (3/14) and *Gliocladium* spp. (3/14). One Gram-negative anaerobic bacillus was isolated and one sample was positive for Ziehl-Neelsen stain. All the patients (100%) with chronic lung disease were infected or colonized with possible/probable pathogens. Most commonly isolated probable pathogen was *Pseudomonas* spp. (88.8%) among patients with chronic lung disease. Half (50%) of diabetic patients and 55.5% of smokers were infected or colonized with possible/probable pathogens.

Conclusions: A high number (73.5%) of BAL revealed growth of possible/probable pathogens indicating a considerable lower airway colonization/infection rate in this population. Employing several microbial detection methods enables the recognition of true colonization/infection rate with microorganisms. The bacteria isolated showed a relatively low antibiotic resistance. Chronic lung disease is a risk factor for lower airway colonization/infection.

Keywords: Bronchoalveolar lavage, Lower airway colonization, Lung pathology, Microbiological analysis

PP 04

Selected Risk Factors and Its Association in a Group of Patients with Cervical or Lumbar Disc Herniation

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Background: Disc herniation is regarded as a major disability in human skeletal system. Although the exact mechanism is not understood, age, sex, heavy occupation, mechanical loading, smoking, vibrations, trauma and strenuous sporting activities are few common causes attributing to disc herniation and those can be widely classified into socio-demographic, behavioural and occupational risk factors.

Objectives: To assess the asscoiation of selected behavioural and occupational risk factors with cervical disc herniation (CDH) or lumbar disc herniation (LDH)

Methods: A descriptive cross-sectional study was conducted in 77 (18-70 years) patients who undergone discectomy for either CDH or LDH in a selected hospital. An interviewer administered questionnaire was used to gather information related to socio-demographic, behavioural, occupational risk factors. Independent sample t-test and Pearson Chi-Square test were used to determine associations. $p < 0.05$ was considered as the level of significance.

Results: There were 54.5% males and 45.5% females while mean ($\pm$SD) body mass index of subjects was 23.8 ($\pm$3.8) kg/m^2. There were 64.9% patients presented with LDH while remaining had CDH. Mean age of the participants was 49.5 ($\pm$12.9) years. There were 79.2% non-smokers and 70.1% nonalcoholics. These did not have any significant difference with CDH and LDH. Majority of CDH (77.7%) and LDH (90%) did not involve in any sports while 53.2% involved in physical exersices. Among the patients, CDH (22.2%) and LDH (26%) involved in heavy strain to back/neck exercises with no significant difference with type of exercises. More than 80% of patients were involved in heavy (45.5%) and moderate strenuous occupational work (44.2%) and mean duration of occupation of patients was 22.7 ($\pm$11.9) years. There was no significant association between physical demanding nature of occupation and duration of occupation in CDH and LDH.

Conclusions: There was no significant association with selected behavioral risk factors such as type of exercise, type of sports and occupational risk factors such as physical demanding nature of occupation, duration of occupation and social history of smoking and alcohol consumption with CDH and LDH.

Keywords: Behavioural risk factors, Cervical disc herniation, Duration of pain, Lumbar disc hernaition, Occupational risk factors

PP 05

The Correlation between Body Mass Index and Levels of Serum Liver Enzymes of 18-32 Aged Healthy Individuals

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Background: Elevated levels of serum liver transaminases and gamma glutamyl transferase (GGT) are good indicators of liver cell and hepatobiliary damages, respectively. But, increased levels of these enzymes mostly prevailed as asymptomatic and eventually leading to chronic hepatic damages. The obesity has been identified as one of the risk factors of liver diseases. If it is possible to build-up a correlation between these enzyme levels and Body Mass Index (BMI), people can go for screening tests by concerning their BMI.

Objectives: To investigate the correlation between BMI and serum levels of alanine aminotransferase (ALT), aspartate aminotransferase (AST) and GGT

Methods: This was a descriptive cross-sectional study. Thirty healthy subjects from each BMI category i.e., underweight (<18.5 kg/m^2), normal weight (18.5-22.9 kg/m^2), over-weight (23-24.9 kg/m^2) and obese (≥25 kg/m^2), belonged to 18-32 years were recruited to the study. The enzymes ALT, AST and GGT were analyzed by Mindray BS-240 Full Automatic Biochemistry Analyzer.

Results: In both genders, the highest serum liver enzyme levels (ALT, AST and GGT) were associated with the obese group while the lowest serum liver enzyme levels were associated with the underweight group. There was a significant positive moderate linear correlation between ALT level and BMI in both females ($r = 0.394$, $p = 0.000$) and males ($r = 0.550$, $p = 0.000$). Although there was a significant positive moderate linear correlation between AST level and BMI in males ($r = 0.411$, $p = 0.006$), there was no significant linear correlation between AST level and BMI in females ($r = 0.216$, $p = 0.060$). Though there was a significant positive moderate linear correlation between GGT level and BMI in males ($r = 0.336$, $p = 0.027$), there was a significant positive but a weak linear correlation between GGT level and BMI in females ($r = 0.231$, $p = 0.043$).

Conclusion: ALT can be suggested as the best liver enzyme that can be used in screening purposes by concerning BMI, since it has the strongest correlation with BMI in males and females.

Keywords: *Alanine aminotransferase, Aspartate aminotransferase, Body Mass Index, Gamma glutamyl transferase*

PP 06

Communication Barriers among Patients and Nursing Students from Two Selected State Universities During their Clinical Learning

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Background: Nursing undergraduates frequently communicate with patients during their clinical training. Communication may act as a barrier to reach the desired quality of their learning. Patient-related and student-related communication barriers pertaining to nursing undergraduates have to be identified and addressed for successful clinical learning.

Objective: To describe the perceived barriers for nursing undergraduates in two state universities to communicate with patients during their clinical learning

Methods: A descriptive cross-sectional study was conducted using a convenient sample of 120 nursing undergraduates from 2nd, 3rd and 4th years at University of Sri Jayewardenepura and Eastern University of Sri Lanka. A previously validated self-administered questionnaire was adopted and pre-tested for this study. It contained nurse-related, patient-related and nursing students related barrriers for comunication. Data were analyzed using General Linear Model in SPSS version 23. Patient-related and student-related communication barriers were categorized as low, moderate and severe according to percentiles.

Results: A majority of participants were females (77.5%). Patient-related and nursing student-related barriers were perceived as moderate barriers by a majority of nursing students 72.5% and 66.6% respectively. Patient-related barriers had the highest overall mean ($\pm$SD) score (3.12 $\pm$0.64) compared to nursing student-related barriers (3.00 $\pm$0.67). The highest mean ($\pm$SD) scores were found for 'serious disease conditions of patients' (3.75 $\pm$1.03) and 'language differences' (3.34 $\pm$1.36) in the categories of patient-related and nursing student-related barriers respectively. Three out of 11 (27.27%) patient-related communication barriers and five out of 19 (26.32%) nursing student-related communication barriers were significantly associated with students' gender, academic year and their respective university.

Conclusions: Nursing students perceived both patient and student-related barriers to communicate moderately. Patient-related barriers were the highest. Hospital authority has to aware the patients regarding the importance of communication with nursing students. Nursing students should be trained on effective communication, interpersonal and language skills during their orientation and before attending clinical training.

Keywords: Clinical learning, Communication barriers, Nursing student, Patient-related and nursing student-related barriers

PP 07

Examination of Patient Perception on Quality of Nursing Care Received at Medical Wards of Private Hospitals in Colombo District

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Background: Healthcare industry plays a major role in a country's economy and the well-being of citizens. This industry is ultimately driven by patient satisfaction, which is decided upon the care received, especially that of the private sector hospitals as patients are expected to pay for their care.

Objective: To identify the patient perception on quality of nursing care in medical wards of private hospitals in Colombo District

Methods: A quantitative descriptive cross-sectional study design was used. Snowball sampling technique was utilized for data collection. Questionnaire generated according to the SERVQUAL (Service Quality) tool, under variables such as assurance, tangibility, empathy, reliability and responsiveness. Questionnaires provided to the general public via google forms and self-administered questionnaire (printed version). Sample was selected as those who had prior experience of being hospitalized at a medical ward of a private hospitals in Colombo district. Data analysis was performed using SPSS.

Results: A total of 397 participants were selected after screening as per inclusion and exclusion criteria. On average 61.1% of the participants were not fully satisfied with the quality of nursing care offered in Colombo private hospitals as per their perceptions. However, 98% of the participants were satisfied with the tangibility of nursing care. Furthermore, on average, 52.4% were not fully satisfied with empathy of quality of nursing care when attending medical wards in Colombo district private hospitals.

Conclusions: More than half of the participants were not fully satisfied with the quality of care in medical wards of private hospitals in Colombo district. Contrarily, majority of the sample is satisfied with the tangibility aspect of nursing care. Empathy variable has been satisfactory only in the half of the participants.

Keywords: Medical ward, Nursing care, Patient perception, Private hospitals, SERVQUAL

PP 08

Knowledge and Practice regarding Surgical Wound Dressing among Nurses at National Hospital for Respiratory Disease, Welisara, Sri Lanka

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Background: Surgical site infections are one of the most common healthcare associated infections and account for 3.2 billion cost per year in acute care hospitals. It is the most frequent cause of 20% unplanned re-admissions after surgery which leads to increased morbidity and mortality. Nurses are the healthcare group which is directly involved in the management of surgical wounds and surgical site infections.

Objective: To assess the knowledge and practices of nurses on surgical site wound dressing among nurses at National Hospital for Respiratory Disease (NHRD)

Methods: A descriptive cross-sectional study was conducted among 150 nurses at NHRD. They were selected by simple random sampling method and a pre-tested, self-administered questionnaire was used to collect data during August, 2019. Data were analyzed using descriptive statistics on SPSS version 23.

Results: Among the 150 nurses, 94% were female and 6% were males and most of them were in between 31-40 years of age. Fifty four percent of nurses had no clear idea regarding purpose of dressing, but 63% aware some important facts of dressing. Eighty eight percent had clear idea regarding sterility maintaining. Majority, 79.3% (n = 119) and 92.7% (n = 139) of nurses had a satisfactory knowledge regarding sterility period and sterile packets respectively. Around 96% nurses had sufficient knowledge regarding the order of wound dressing and types. Majority of nurses (96%, n = 144) had satisfactory practices regarding wound dressing, similar proportion had satisfactory practices regarding medical hand washing procedures. Only 10% of nurses had gained knowledge on dressing from in service programs.

Conclusions: Nurses had sufficient knowledge and practice in surgical wound dressing. It is needed to update and maintain the knowledge and practical skills about surgical wound management for nurses through in-service training.

Keywords: Knowledge, Nurses, Practices, Wound dressing

PP 09

Pain Experience among Elderly Individuals with Traumatic Injuries Admitted to Surgical Sections in National Hospital, Sri Lanka

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Background: Elders are highly vulnerable to injuries and fractures, which cause chronic pain and suffering consequently affecting their quality of life. The burden of elderly injuries has become a public health problem.

Objectives: To determine the pain experience and associated factors among elderly patients with traumatic fractures and injuries admitted to the National Hospital of Sri Lanka

Methods: A descriptive cross-sectional study was conducted with the participation of randomly selected 150 conscious elderly patients above 65 years who admitted to the orthopaedic, surgical and accident service wards in National Hospital of Sri Lanka. A pre-tested interviewer administered questionnaire and Wong-Baker's pain scale which is tested and validated in Sri Lanka were used for data collection. Pearson's Chi-square test was performed to determine the association of level of pain with demographic and personal factors with SPSS version 23. Level of significance was set as 0.05.

Results: Among 150 participants, there were 56% males and majority (84.7%) were in 65-74 years of age. Fifty four of participants experienced unintentional incidents. Most prevalent injury site was lower extremities (44.7%), while 28%, 6%, 6.7% and 14.7% experienced upper extremity, head, face and multiple site injuries respectively. Around half (49.7%) of the individuals reported fractures as a result of the injurious event. Only 6.7% of the individuals reported that they have sought alternative treatments before attending hospital care. Regarding the level of pain, 30.7% of individuals reported moderate or severe pain and 50.7% reported mild pain. There were significant associations of level of pain with age ($p = 0.05$), gender ($p = 0.007$) and site of injury ($p = 0.006$).

Conclusions: Around one third of the elderly individuals with traumatic injuries were suffering from moderate or severe pain. Age, gender and site of injury were the associated factors for pain. This study emphasizes the importance of implementation of pain management strategies for the elderly individuals who experienced traumatic injuries.

Keywords: Elders, Pain experience, Traumatic injuries

PP 10

Perception on Objective Structured Clinical Evaluation Method among First Year Nursing Students at Selected Government Nursing Schools in Sri Lanka

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Background: One of the essential components of learning and educational program is evaluation or examination. Among the various methods for evaluating clinical skills, Objective Structured Clinical Examination (OSCE) has been recognized as the most reliable method for evaluating clinical skills. Due to lack of objective clinical assessment, competency in clinical assessment in government nursing schools in Sri Lanka has become compromised. Only few nursing schools have introduced this method at the end of their introductory clinical procedures. As an important group of stakeholders, the feedback of the students who experienced OSCE, is important in improving it as an evaluation method in basic nursing diploma programme.

Objectives: To evaluate the students' perception on OSCE method among first year nursing students of selected government nursing schools in Sri Lanka

Methods: A descriptive cross-sectional survey with a randomly selected 387 first year nursing students at Schools of Nursing, Kandana and Kurunegala was conducted. Data collection was done with a pre-tested, self-administered questionnaire prepared by the researchers within two weeks of completion of the OSCE. Data were described using descriptive and inferential statistics. Significance was set as $p < 0.05$.

Results: Response rate was 92%. The mean ($\pm$SD) age was 22 ($\pm$1) years. Majority of nursing students were females (n = 360, 94.6%), Sinhalese (n = 385, 99.5%) and Buddhists (n = 372, 96.1%). Results indicated that the view of most of the students regarding OSCE test was good; good perception (48.6%) and relatively good perception (50.9%). OSCE test has been good in terms of fairness (46.8%), suitability (52.2%), comprehensiveness (67.2%) and accessibility (31.3%). Socio-demographic factors did not significantly associate with students' perception about OSCE ($p > 0.05$).

Conclusions: Nursing students positively perceived the OSCE as a good evaluation method of clinical examination in terms of fairness, suitability, acceptability and comprehensiveness. The Nursing schools should use OSCE more often in evaluating students, initiate those who never used OSCE and in enhancing quality of the test.

Keywords: Evaluation, Government nursing school, Nursing education, Nursing students, Objective structured clinical examination

PP 11

Prevalence, Severity and Management of Dietary Problems in Pregnancy among Pregnant Mothers Admitted to a Tertiary Care Obstetric Facility in Southern Sri Lanka

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Background: Maternal nutrition is an important determinant of fetal growth and development. Therefore, it is essential to ensure an adequate and balanced diet during pregnancy. Many pregnant mothers experience dietary problems in pregnancy due to physiological changes and/or dietary behaviors that are generally neglected in routine healthcare provision.

Objectives: To assess the prevalence of dietary problems in pregnancy, their severity and management among pregnant mothers admitted to Teaching Hospital, Mahamodara, Sri Lanka

Methods: A cross-sectional study was conducted among a consecutive sample of 384 mothers who delivered their babies at the four maternity wards of Teaching Hospital, Mahamodara during November 2019. An interviewer administered questionnaire was administered which was developed based on expert opinion and published literature. Severity of dietary problems was assessed based on the effect it had on the daily life of the mother. Data were analyzed using SPSS version 25.

Results: Of the participants, 88.3% were Sinhalese, 0.8% was Tamils and 10.9% were Muslims. Their mean (±SD) age of the mothers was 28.8 (±5.7) years. Approximately, 96.4% had experienced at least one dietary problem during the pregnancy and the highest prevalence of dietary problems was observed in the first trimester (86.5%). The commonest dietary problem experienced was food aversions (71.6%), followed by morning sickness (67.7%), food cravings (54.7%) and heart burn (46.9%). 38.8% mothers experienced constipation. According to clinical records, 40.9% had Iron Deficiency Anaemia (IDA) and 12.2% had Gestational Diabetes Mellitus (GDM). The least common dietary problems were pica (7.6%) and food borne illnesses (0.3%). A considerable proportion of mothers with food aversion (56.9%), morning sickness (52.1%), heart burn (38.1%) and constipation (10.7%) had their daily life affected by these conditions. The majority had not used any treatment to manage the dietary problems except those with IDA and GDM; nearly 96% with IDA used western medicine and most of mothers (61.7%) with GDM used dietary modifications. Few mothers required hospital admission for food aversion (4.7%), morning sickness (7.3%) and heart burn (1.7%).

Conclusions: Majority of the mothers experienced dietary problems during pregnancy; the commonest being food aversion. Although food aversion, morning sickness, heart burn and constipation had affected their daily life, most did not seek any treatment.

Keywords: *Dietary problems, Management, Pregnancy, Sri Lanka*

PP 12

The Knowledge, Attitudes and Practices on Urinary Catheterization and Catheter-Associated Urinary Tract Infections Among Nursing Officers in Teaching Hospital Karapitiya, Sri Lanka

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Background: Urinary catheterization is a common procedure done by nurses. Nurse are responsible for inserting urinary catheter, catheter care and removal. Catheter Associated Urinary Tract Infections (CAUTI) is a common complication of the urinary catheterization. Nursing officers', knowldge, attitude and practice (KAP) regarding the insertion and care of urinary catheter are essential to reduce and prevent CAUTI.

Objectives: To assess the KAP on urinary catheterization and CAUTI among nursing officers in Teaching Hospital Karapitiya (THK), Sri Lanka

Methodology: A descriptive cross-sectional study was conducted among nursing officers in THK. Conveniently selected 400 nursing officers particpated in the study from medical, surgical and special units in THK. A self-administered, pre-tested questionnaire was used to collect data. In the questionnaire, 15 questions assessed knowledge, 8 assessed the attitudes, and 9 assessed the practices. Scores for KAP were analysed.

Results: Majority of participants were females 362 (90.5%). Among the nursing officers, 43.5% were belonged to 30-39 age category. There were 366 (90.15%) diploma holders. Among the participants, 293 (73.3%) had clinical experience of more than 10 years. Mean ($\pm$SD) knowledge score of the participants was 9.45 ($\pm$2.92). Majority of them, 297 (70.43%) had moderate knowledge. Mean ($\pm$SD) score of attitudes was 6.46 ($\pm$1.30) and majority of 246 (61.5%) had good attitudes. Mean ($\pm$SD) practice score was 7.56 ($\pm$1.53) and 337 (84%) of participants had good practice. Study results showed that age ($p = 0.02$) and experience ($p = 0.002$) have a significant association with knowledge. Only age ($p = 0.04$) had significant effect on attitude. It was found that practice has a significant effect with the gender ($p = 0.03$) and experience ($p = 0.007$).

Conclusions: KAP for urinary catheterization and CAUTI is in a satisfactory level among nursing officers in THK. Age, experience and gender affected the KAP.

Keywords: Attitude, Catheter associated urinary tract infections, Knowledge, Nursing officers, Practices

PP 13

The Knowledge, Attitudes and Practices Regarding First Aid among Nurses in Teaching Hospital Karapitiya, Sri Lanka

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Background: First aid is the initial step in patient management which aims in saving lives of injured victims. Nursing officers play an important role in this as frontline healthcare givers.

Objective: To assess the knowledge, practices and attitudes of first aid among nursing officers in the Teaching Hospital Karapitiya (THK)

Methods: This was a cross-sectional descriptive study done among 400 nursing officers in the THK. Convenient sampling method was used to select the study participants. Data were collected using a self-administered questionnaire which was developed by authors and pre-tested for the reliability. The questionnaire consists of three aspects regarding the first aid such as knowledge, practices and attitudes. A score was given for each part.

Results: The mean (±SD) knowledge, attitude and practice scores were 62.11 (±6.57), 26.60 (±3.90) and 53.32 (±7.63), respectively. Majority of the participants (n = 356, 88.5%) had good overall knowledge on first aid. The participants had good knowledge on different types of emergencies in different proportions; burn (89.7%), fractures (88%), seizures (97%) and poisoning (73.3%). The practice was good only among 166 (41.5%) nurses. Participants showed good practice in different emergencies; burn (49.3%), fractures (81.5%), seizures (75.5%), and poisoning (71.8%). However, the attitude was moderate among majority of nurses (n = 225, 56.3%).

Conclusion: The majority of the nurses had good knowledge on first aid while the practice and attitude of first aid were moderate in most of the nurses in THK.

Keywords: Attitude, First aid, Knowledge, Nursing officers, Practice

PP 14

The Role of the Paediatric Nurse in Discharge Planning:
A Systematic Review

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Background: Effective discharge planning can minimize the unnecessary utilization of healthcare facilities. Paediatric discharge planning is a complex process and nurses need lengthy preparations. Role confusion among nurses will disrupt the smooth discharge. In Sri Lanka, although there is a possibility of reducing health costs through effective discharge planning led by paediatric nurses, it is questionable whether Sri Lankan nurses have defined their role in the discharge planning process. Therefore, exploring the available scientific evidence on the topic is in utmost need.

Objective: To map different roles of nurses in the paediatric discharge planning process

Methods: This is a systematic review which was done with electronic databases; PubMed and CINAHL. They were searched for peer-reviewed journal articles among the paediatric population from 2005-2019, using the keywords; discharge planning, paediatric nurse, care transitions, transitional care, and Sri Lankan nurse. Additional websites were explored to find literature in Sri Lanka. Articles resulted in the word combination 'Discharge planning and paediatric nursing (n = 329) were used for screening. Duplicates were removed (n = 13). Two hundred and forty articles that are out of the nursing scope and sixty articles that do not describe a clear nursing involvement in the discharge process were excluded, based on abstract review and full-text review respectively.

Results: Sixteen studies were included in the final review. No literature was found on the topic among Sri Lankan paediatric population. Four main categories of nurses' roles were identified with the thematic analysis namely 'discharge educator, discharge collaborator, post-discharge care coordinator and family counselor'.

Conclusions: In Sri Lanka, no such defined roles of a nurse have been established yet in the discharge planning of paediatric patients. These roles may help nurses to carry out discharge planning effectively, and future studies are needed on this topic in Sri Lanka.

Keywords: *Discharge planning, Nurses' role, Pediatric nurse, Sri Lanka*

PP 15

Antibacterial Effect of Selected Medicinal Plants Used in Ayurveda against Wound Infecting Bacteria

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Background: The increasing antimicrobial resistance exhibited by wound infecting bacteria has led to extensive research on the antimicrobial activity of selected medicinal plants.

Objective: To investigate and compare the antibacterial activity of five medicinal plants, *Asparagus falcatus* L./Hathavariya (Rhizome & roots)*, Cinnamomum verum* J. Presl/Kurundu (Stem bark), *Coriandrum sativum* L./Koththamalli (Leaves), *Nigella sativa* L./Kaluduru (Seeds), *Trachyspermum involucratum* (Roxb.) Maire/Asamodagam (Seeds), against common wound infecting bacteria *Pseudomonas aeruginosa* (ATCC 27853) and *Staphylococcus aureus* (ATCC 25923)

Methods: Total of 15 plant extracts were prepared in aqueous, ethanol and acetone and screened for antibacterial activity against each test strains triplicated by agar disk diffusion method with positive control. Average Zone of Inhibition (ZOI) was calculated. The Minimum Inhibitory Concentration (MIC) and Minimum Bacterial Concentration (MBC) were determined by broth dilution and drop plate methods respectively only for plant extracts which showed a zone of inhibition.

Results: Acetone extract of *Cinnamomum verum* J. Presl (average (±SD) ZOI of 6 (±0.00) mm with MIC of 50 mg/ mL and MBC of 100 mg/ mL), ethanol extract of *Cinnamomum verum* J. Presl (average ZOI of 10.33 (±0.58) mm with MIC of 3.125 mg/mL and MBC of 6.25 mg/ mL), and acetone extract of *Nigella sativa* L. (average ZOI of 10.33 (±0.58) mm with MIC of 3.125 mg/ mL and MBC of 6.25 mg/ mL) have shown antibacterial activity on *Pseudomonas aeruginosa*. Ethanol extract of *Cinnamomum verum* J. Presl showed antibacterial activity (average ZOI of 19.66 (±0.58) mm with MIC of 100 mg/ mL and MBC of >100 mg/ mL) on *Staphylococcus aureus.*

Conclusions: Ethanol and acetone extracts of *Cinnamomum verum* J. Presl and acetone extract of *Nigella sativa* L. were found to be effective against tested strains while remaining plant extracts did not possess antibacterial effect against tested strains.

Keywords: Antibacterial, Ayurveda, Bacteria, Plants, Wound.

PP 16

A Study on Antibiotic Use by Patients with Symptoms Suggestive of Influenza or Common Cold for less than Three Days in Outpatient Department of Divisional Hospital, Udawalawa

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Background: Development of antibiotic resistance is a global challenge. Some of the factors contributing to the development of antibiotic resistance are prescribing antibiotics when they are not indicated (or required) and self-medication with antibiotics. Irrational prescription of antibiotics for viral infections is not uncommon.

Objective: To assess the type of antibiotics used by the patients who attended to outpatient department (OPD), Divisional Hospital, Udawalawa with symptoms suggestive of influenza or common cold for less than three days

Methods: A descriptive cross-sectional study was conducted with 629 participants. Data were collected with an interviewer administered questionnaire in a convenient sample. The patients were categorized in to two groups based on the symptoms (group-1 - runny nose, sneezing, cough, nasal obstruction, sore throat; group-2 - fever, headache, tiredness, myalgia, bodyaches, malaise, hoarseness, chillness). Those who have symptoms in group-2 without any symptoms of group-1 were excluded from the study. Data were analyzed with descriptive statistics and Chi-square test using SPSS version 25.

Results: Sample comprised of 42.9% males and 57.1% females. Hospital OPD had prescribed antibiotics for 528 (83.9%) of them. Amoxicillin (86.17%) is the most frequently prescribed antibiotic. Cephalexin (13.06%), Erythromycin (0.57%) and Flucloxacillin (0.19%) are the other commonly prescribed antibiotics. Before coming to the hospital, 13 patients had used antibiotics without a prescription. Majority of the patients (77.1%) do not have a basic understanding about used antibiotics.

Conclusions: The study found that over 83.9% patients with symptoms suggestive of influenza or common cold for less than 3 days received antibiotics. These findings suggest having strict guidelines on antibiotic use.

Keywords: Antibiotics, Common cold, Influenza

PP 17

Evaluation of *in vitro* Anti-inflammatory Effect of *Sida cordifolia* and *Phyllanthus debillis* Extracts

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Background: *Sida cordifolia* (Babila, Malvaceae) and *Phyllanthus debillis* (Pitawakka, Euphoribiaceae) have been used in the Sri Lankan ayurvedic medicinal preparations due to their anti-inflammatory activity. However, the *in vitro* anti-inflammatory effect of these plants has not been studied scientifically.

Objective: To determine the *in vitro* anti-inflammatory effect of ethanol, aqueous and hexane extracts of *Sida cordifolia* (Babila) and *Phyllanthus debillis* (Pitawakka)

Method: The anti-inflammatory activity was evaluated by the heat induced membrane stabilization assay against diclofenac sodium as the positive control. Percentages of human red blood cell (HRBC) membrane stabilization of different concentrations of ethanol, hexane and aqueous extracts of the plant were calculated. Haemolysis was measured at 540 nm wave length and the percentage inhibition of haemolysis was calculated. Qualitative phytochemical screening was carried out to identify the phytochemicals present in the two aqueous plant extracts. Statistical analyses were performed by ANOVA. $p < 0.05$ was considered as statistically significant.

Results: Ethanol, aqueous and hexane extracts of *Phyllanthus debillis* showed 80.52%, 65.00% and 27.98% protection, respectively compared to diclofenac sodium (96.19%) at a dose of 1000 µg/mL. The potency of roots extract of *Sida cordifolia* was compared with diclofenac sodium (96.19%) and it showed 79.16%, 54.86%, 25.68% protection for ethanol, aqueous and hexane extracts at a dose of 1000 µg/mL in the *in-vitro* HRBC membrane stabilization assay respectively. All the extracts showed a dose dependent significant ($p < 0.01$) anti-inflammatory activity in human red blood cell membrane stabilization assay. Phytochemical analysis revealed that proteins and saponins were absent in the two plant extracts. The two extracts showed positive results for tannins, reducing sugars and flavonoids.

Conclusions: Ethanol extract of both plants showed the highest anti-inflammatory activity compared to hexane and aqueous extracts. Phytochemicals identified responsible for the effect and further analysis involving fractionation and identification of active constituents would allow to identify the compounds responsible for the anti-inflammatory effect of *Sida cordifolia* and *Phyllanthus debillis.*

Keywords: *Anti-inflammatory, Diclofenac sodium, Human Red Blood Cell (HRBC), Membrane stabilization*

PP 18

Investigation of *in-vitro* Anti-inflammatory Activity of Hexane Extract of *Costus speciosus* Leaves

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Bacground: In the current study, non-polar n-hexane fraction of *C. speciosus*, family *Coastaceae,* has been investigated for its anti-inflammatory activity. The previous investigations have proven the biological activity including anti-inflammatory activity of n-hexane fractions of *Costus speciosus* rhizome.

Objectives: To investigate *in vitro* anti-inflammatory activity of hexane extract of *C. speciosus* leaves (HECS)

Methods: A soft extract of *C. speciosus* leaves was obtained after refluxing with haxane. The *in-vitro* anti-inflammatory activity (% inhibition) of HECS was investigated by ova albumin denaturation (OAD) and heat induced human red blood cell membrane stabilization (HRBC) assays against a standard, diclofenac sodium (D. sodium). The activity guided fractionation of HECS was done using a silica column fractionation, with gradial elution of n-hexane, carbon tetrachloride (CCl_4) and ethyl acetate (EtOAc). Fractions were pooled into 7 sub fractions (A-G) using thin layer chromatography (TLC) and determined *in-vitro* activity.

Results: The dose dependent study showed no significant ($p = 0.063$) activity based on OAD-assay at 1.00 mg/mL. However, the HRBC-assay showed a significant ($p = 0.004$) activity, when compared to D. sodium. The maximum activity of 42.32 (±1.00)% (HECS) and 37.49 (±1.50)% (D. sodium) was observed in OAD-assay and 50.93 (±1.53)% (HECS) and 28.74 (±1.11)% (D. sodium) in HRBC-assay, at a dose of 1.00 mg/mL. The sub fractions, B (100% CCl_4) and G (CCl_4: EtOAc 50:50, CCl_4: EtOAc 25:75 and 100% EtOAc), have shown high *in-vitro* anti-inflammatory inhibition. The % inhibitory activity was found to be, 89.7 (±6.9)% (B) and 92.0 (±8.9)% (G) for HRBC-assay and 55.9 (±4.4)% (B) and 39.4 (±7.2)% (G) for OAD-assay, respectively.

Conclusions: The anti-inflammatory activity of sub fractions of *C. Speciosus* based on OAD and HRBC assays indicate that HECS could be used as a potential source for developing novel anti-inflammatory agents.

Keywords: Anti-inflammatory activity, hexane extract of Costus speciosus leaves, Sub fractions

PP 19

Knowledge on Correct Therapeutic Dose and Toxic Dose of Paracetamol among Doctors and Nurses in Paediatric Units in Teaching Hospital, Karapitiya

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Background: Paracetamol is a widely used antipyretic and analgesic drug. It is safe for all age groups if proper dose is administered. It is the most common agent involved in drug overdose and causes liver and renal damages. When prescribing and administering paracetamol to children, precautions need to be taken since supra-therapeutic doses are not uncommon. Single therapeutic dose and maximum therapeutic dose of paracetamol for 24 hours are defined as 10-15 mg/kg and 75 mg/kg respectively. Single toxic dose is 200 mg/kg.

Objective: To assess the knowledge on correct therapeutic dose and single toxic dose of paracetamol among doctors and nurses working in paediatric wards and emergency treatment unit (ETU) at Teaching Hospital, Karapitiya (THK)

Methods: A descriptive cross-sectional research methodology was carried out recruiting doctors and nurses who work in the paediatric wards and ETU in THK. The data collection was carried out among 100 healthcare workers (50 doctors and 50 nurses) distributing a self-administered pre-tested questionnaire.

Results: The mean (±SD) age of the participants was 36.5 (±7.9) years. The 98% of the participants (48 doctors and 50 nurses) has the knowledge about the correct single dose. The 93% (44 doctors and 49 nurses) lacks the knowledge of the maximum therapeutic dose that could be given per day for a child and four participants (3 doctors and one nurse) did not provide answer to the question about this. Only 56% (31 doctors and 25 nurses) has the knowledge of the correct acute toxic single dose. There is a significant association between the work experience in paediatric unit/ ETU and the knowledge of acute single toxic dose ($X^2 = 14.8$, $p = 0.04$).

Conclusions: The knowledge on maximum therapeutic dose of paracetamol and its acute single toxic dose that can be given to a child within 24 hours was not satisfactory among doctors and nurses despite working in paediatric wards and ETU.

Keywords: *Health personnel, Knowledge, Paediatrics, Paracetamol, Professional practice*

PP 20

Prevalence and Reasons for Self-Medication with Antibiotics among the Students in a Private Institute, Sri Lanka

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Background: A common human experience is coping with disorder or illness. However, the reaction of the person to such a condition is based on specific individual values and some other underlying factors that contribute to self-care or self-medication. As a result of the escalation of antibiotic self-medication practices, it has turned out to be fatal in terms of antibiotic resistance, which has led to increased awareness of the reasons that arise from self-medication.

Objectives: To find the prevalence of self-medication with antibiotics (SMA) and reasons for self-medication and to find the knowledge of SMA among the students in a private institute in Sri Lanka

Methods: The research was conducted as a descriptive cross-sectional study using a self-administered questionnaire. Data were collected among students in a private institute in Sri Lanka. The study sample consisted of 110 students who are following Diploma programs on Nursing, Biomedical Sciences, Physiotherapy, and Foundation programs. The sample was selected using a simple random sampling technique.

Results: The prevalence of SMA was much higher (n = 93, 84.5%). Around 23% (n = 25) of students who mentioned on SMA rarely visited a qualified medical practitioner. The reasons in favor of SMA were; quick relief (n = 28, 25.5%), convenience (n = 18, 16.4%), unwillingness to visit a doctor for minor illnesses (n = 41, 37.3%). Moreover, easy accessibility to medical stores (n = 56, 50.9%) and availability of medicines at home (n = 31, 28.2%) were seen as factors for SMA. More than 50% of the study participants had good knowledge on SMA such as; antibiotic resistance, usage of antibiotics for the recovery of viral infections, and speed of recovery of cold and cough.

Conclusions: Though most students have good knowledge on SMA, there is a high prevalence of SMA among the students. To prevent this problem, strict policies on the sale of medicines need to be put in place.

Keywords: *Antibiotics, Antibiotic resistance, Self-Medication*

PP 21

Assessment of Knowledge and Attitudes on Sexual Education among Teenagers in Matale District, Sri Lanka

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Background: Sexual education aims to strengthen the ability of adolescents into making the correct choices regarding relationships, sexuality and health. Meanwhile, it does not encourage them to engage in sexual activities. It gradually equips and empowers children and young people with information, skills and positive values to understand their sexuality, have safe relationships and take responsibility for their own and other people's sexual health and wellbeing.

Objective: To identify the level of knowledge and attitudes on sexual education among teenagers

Methods: A descriptive, cross-sectional study was conducted among 100 (13-19 years) teenagers. Convenient sampling technique was used to select the research sample of school students in Matale District, Sri Lanka. Data were collected using a self-administered questionnaire.

Results: The majority of the students (53.1%) have received knowledge of sexual education from their parents. The respondents were asked whether the sexual education was useful for their life and the majority said that it is useful (86.8%). A 26.5% of the sample had felt very comfortable while the least amount of the sample 2% had felt very uncomfortable during the lesson. Half of the participants have negatively responded on the acceptability for boys and girls of their age to have the opposite gender partner during the lesson on sexual education. The 80% of students indicated that they knew contraception methods and few respondents had mentioned family planning methods and 20% of the sample indicated that they did not know about any contraception methods.

Conclusions: The parents support on sexual education is at an average level, however, most of the students had identified that the sexual education is useful for their life. Considering their attitudes, the students' acceptability for the opposite gender partner during the lesson was negative though their level of knowledge states at a good level.

Keywords: Attitudes, Knowledge, Sexual education, Teenagers

PP 22

Assessment of Weight and Quality of Backpacks Used by Children in Selected School in Galle District

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Background: Heavy backpacks can cause back-pain and postural defects in children. Over the years, the weight of school backpack and the number of children getting treated with spinal braces for scoliosis have increased. Scientific research shows that maximum weight of backpack should be between 10-15% of child's body weight.

Objectives: To evaluate the quality and the percent weight of the backpack per child's weight in age groups from 9-14 years in four selected schools in Galle district and to investigate solutions to reduce the weight of school backpack

Methods: The study sample comprised of 693 school children from grades 4-9. Weight of child and weight of backpack were accessed over a week. Quality of backpacks was assessed using a data collection tool. The quality of the backpack was evaluated with pre-defined criteria namely, type of backpack, width of the shoulder strap, abdominal strap availability and empty backpack weight. Forty school teachers were interviewed and ideas were collected on how to reduce weight of school backpack.

Results: The study shows that approximately 60% of backpacks weighed more than 15% of child's body weight, 29% of backpacks were within 10-15% weight range and only 11% weighed less than 10% of child's body weight. Mean ($\pm$SD) backpack to body weight percentage was 17.41 ($\pm$6.94) of the body weight. The highest weight percentage (21 $\pm$3.50) was observed in students attending grade four. Assessment of backpack quality showed that 44% of backpacks were not in good quality. Feedback from teachers to reduce backpack weight includes; converting single periods to double periods, advising children to use an extra bag, encouraging the children to wear the backpack properly.

Conclusions: Use of over-weighted and poor-quality backpacks were common among school children. Feasible solutions to reduce backpack weight were identified. Therefore, necessary precautions should be taken to reduce backpack weight of school children.

Keywords*: Backpack, School children, Quality*

PP 23

A Study on the Level of General Health Education and the Barriers to Health Literacy among the Public in Gampaha District, Sri Lanka

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Background: Health determines the quality of life. Health education is the degree to which people have the capacity to obtain, process and understand health information needed to make healthy choices. The ability to understand the changes in health conditions, to avoid complications and to get rid of diseases is known as health literacy. People suffer from various diseases and health complications as they are deprived of proper health education and health literacy.

Objectives: To assess individual perception on barriers of health literacy and to find reliable methods of enhancing health education

Methods: A descriptive, cross-sectional study was conducted using convenient public sample. The data were collected through a self developed pre-tested questionnaire and analysed stastitically using SPSS version 25.

Results: The total number of responses was 272. The majority (88%) were, at least qualified with Advanced Level and 84% of the study sample was below 30 years. About 88% was confident and satisfied with their level of health information. From the participants, 92% agreed that health education is important for a happy and healthy life. About 65% believed that their level of health education is sufficient for self-diagnosis. Majority (70%) stated that they can avoid risks that would result in any conditions or complications. About 74% indicated that the level of education, unavailability of reliable sources and socio-economic conditions are the main barriers to health literacy. The best modes of communicating health information, as per them, are internet, healthcare awareness programmes and television as responded by 37%, 22% and 22% respectively. About 41% stated that healthcare providers do not educate people enough on their illnesses.

Conclusions: People need more knowledge on health education. Barriers to health literacy can be avoided and health education can be developed, if the right methods are implemented. Health providers should take initiative to enhance healthy lifestyles.

Keywords: *Awareness, Barriers, Healthcare, Health education, Health literacy*

PP 24

A Study on the Popularity of Different Types of Skincare Agents among the Inhabitants in Anuradhapura District, Sri Lanka

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Background: A skincare agent is a product that is rubbed, poured, sprinkled, or sprayed on, or applied to the human body for cleansing, beautification, or enhancing appearance. They come as moisturizers, sunscreens, anti-aging creams, fairness creams etc and are composed of either synthetic chemicals or natural ingredients of herbal origin. Sri Lanka has a tropical climate with varying temperature and the country receives ample sunlight throughout the year. Most of the Sri Lankans are frequently exposed to sunlight. This is especially important in Anuradhapura district where many agricultural communities live. Therefore, the usage of skincare agents is important not only to maintain the beauty but also in terms of health perspectives.

Objective: To evaluate the popularity of different types of skincare products among the people in Anuradhapura district

Methods: Four hundred and four participants who live in Anuradhapura district were selected for the study. The participants were selected from all 23 divisional secretariats in the district based on the population of different divisional secretariats. The convenient sampling technique was employed and the data were collected using an interviewer administered questionnaire. Data were analyzed by descriptive statistics.

Results: The study population comprised of 187 (47.3%) males and 217 (53.7%) females. Considering the total of 404 participants, 221 (54.7%) were identified as users of skincare products. Among the different categories of skincare products, moisturizer creams were the most popular type (62.90%) while 33.03% used sunscreens. There was a considerable usage of moisturizer creams among the age group of 18 -25 years (20.36%) and 26-35 years (19.46%). Among the users of skincare products, 79.64% preferred herbal skincare formulations while 4.07% used synthetic products and 16.29% of the respondents mentioned that they use both types of products. The leaves of *Aloe vera* was the most widely used plant material for home-made herbal formulations and it was used as a fairness-enhancer and a moisturizer.

Conclusions: Skincare agents are widely used by the inhabitants in Anuradhapura district and there was a considerable usage of moisturizer creams. Interestingly, most of the users prefer herbal formulations over synthetic products.

Keywords: Anuradhapura district, Herbal, Skincare agents

PP 25

Awareness of Home-Based Management of Childhood Diarrhoea among Mothers of Children under Five Years old in Kurunegala District, Sri Lanka

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Background: Worldwide, about 480,000 children die annually from diarrhoea despite availability of simple effective treatment. According to UNICEF and WHO diarrhoea can be controlled by home-based management with Oral Rehydration Therapy. Therefore, it is important to determine the awareness of the mothers regarding home-based management of diarrhoea.

Objectives: To determine the awareness of mothers who have chidren under five years about diarrheal diseases, symptoms, symptoms of dehydration and awareness about the practices of home based management of childhood diarrhoea

Methods: A descriptive, cross-sectional study was conducted with 130 mothers who have children under 5 years of age in Kurunegala district using a self-administered questionnaire which was available in both Sinhala and English languages. Convenient sampling technique was used as the sampling method. Data were analyzed using Microsoft Excel and SPSS version 22.

Results: Almost all the participants had heard about diarrhoea (98.4%) and 93% of respodents had the idea that diarrhoea is passing watery stools while 72.1% had responded for abdominal pain and 26.4% for fever. Dehydration is considered as the most severe stage of diarrhoea, 74.6% had selected dry mouth as a symptom of dehydration while 40.5% and 23% had selected cracked lips and urinating less frequently respectively. Only 6.3% and 1.6% had chosen more salivation and hyperactivity respectively. The aspects to analyse the understanding of the practices related to home-based management of childhood diarrhoea revealed that only 56% had selected the response to administer oral rehydration solution (ORS) always. About the fact that a prepared ORS can be used for only 24 hours, 69.8% had selected the correct answer.

Conclusions: Mothers need more knowledge and awareness about the symptoms of diarrhoea and dehydration as well as practices of management and proper handling of ORS.

Keywords: Awareness, Dehydration, Diarrhea, Management, Oral Replacement Solution

PP 26

Awareness on the Screening Methods of Breast Cancer Among Females in Colombo District, Sri Lanka

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Bakground: Breast cancer is considered as the commonest cancer that affects women. Due to the critical escalation of breast cancer incidence, it has become vital to inform the community regarding breast cancer manifestations, risk factors, and early detection methods.

Objectives: To assess the awareness regarding signs and symptoms and screening methods of breast cancer among females aged 20-40 years in the Colombo District

Methods: A descriptive, cross-sectional survey was carried out. A closed-ended questionnaire was distributed among conveniently selected 400 women, aged 20-40 years in Colombo District. Results were analyzed to determine the correlation between the level of awareness of screening methods and demographics. Responses obtained from questions regarding awareness were analyzed using an assessment scale.

Results: Awareness on breast cancer signs and symptoms was not satisfactory among the public although 72.8% of the individuals were aware of the discharge from the nipple, only 46.6% and 50.4% respectively were aware of the skin's texture, and redness and swelling. Considering screening methods, even though 77.4% of partcipants were aware of mammography, only 59% were aware of other screening methods. There was a positive correlation between awareness of screening methods for breast cancer and the level of education ($p <0.001$), however, there was no correlation of that with the age ($p = 0.55$).

Conclusions: It was evident that the overall awareness level of breast cancer screening methods is not satisfactory. There is a positive relationship, as per evidence between education level and the awareness level of screening methods in women but not the age. Further research has to be conducted to find the effectiveness of awareness raising campaigns of breast cancer screening methods among females in Sri Lanka.

Keywords: Awareness, Breast cancer, Prevalence, Screening methods

PP 27

Barriers for Performing Breast Self-Examination among the Advanced Level Students in Selected Girls' School, Gampaha District

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Background: Breast cancer is the most common cancer affecting the women worldwide. In 2018, 1183 deaths were occurred attributed to breast cancers in Sri Lanka. Early detection and prompt treatment will reduce the risk of death and regular Breast Self Examination (BSE) will ensure the early detection of breast cancer. School girls are the next female generation of the society in which the awareness of the breast cancer and the practices on BSE need to be improved for a healthy society.

Objectives: To evaluate the barriers for performing BSE among the female advanced level students in a selected girls' school in Gampaha district

Methods: A descriptive cross-sectional study was conducted among 400 advanced level students in a selected girls' school in Gampaha district. Students were enrolled using systematic random sampling method. A pretested self-administered questionnaire was used to collect data. Data were analysed using descriptive statistics.

Results: The advanced level students from Science (33%), Art (29%) and Commerce (38%) streams were participated in the study. Majority of the participants were Sinhalese (97.8%) and Buddhists (95%). Of the participants, 15.2% had family history of cancer and among them, 4.3% had family history of breast cancer. Only 1.3% of the students had performed the BSE at least once during their life and only 1% had positive attitudes regarding the BSE. The most commonly reported barriers for BSE were lack of self-concern (67%), feeling uncomfortable (55%), fear (54%), shame (47%) and lack of knowledge (61%).

Conclusions: Majority of the students have not performed BSE. Lack of self-concern, feeling uncomfortable, feer, shame and lack of knowledge were the barrires to perform BSE. Awareness and attitude regarding the breast cancer and BSE should be improved and school based awereness programmes can be implimented to fill the gaps in knowledge and attitudes.

Keywords: *Breast Cancer, Breast self-examination, Girls*

PP 28

Breakfast Skipping: Associated Factors and Its Effect on Academic Performances of School Children in the Zonal Education Division-Galle

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Background: Breakfast is considered as the most important meal of the day. However, it was identified as the mostly skipping meal of the day, especially among children. Regular breakfast consumption helps to maintain benefit toward academic performances among school going children.

Objective: To study breakfast skipping pattern and its effect on academic performances among school children in Zonal Education Division, Galle

Methods: A descriptive cross-sectional study was conducted among 280 school children in selected three grades (Grade 8, 9 & 10) in selected popular schools in Zonal Education Division, Galle. The sample was selected using convenient sampling method. Self-administered questionnaires were used to collect information on breakfast habits. Dietary recall method was used to obtain information on the children's food intake. Academic performances were measured using average marks obtained for the term test. Data analysis was done using statistical package of social science version 25. Level of significance was considered as 0.05.

Results: Nearly half of the sample was boys (n = 145, 51.8%). Mean (±SD) age of the students was 14.1(±0.7) years. Breakfast skipping was identified among 25% (n = 70) of students. Lack of time (n = 45, 64.3%), lack of appetite (n = 19, 27.2%), less variety of foods (n = 2, 2.8%) and unavailability of breakfast (n = 4, 5.7%) were identified as leading causes for breakfast skipping. Majority (n = 45, 64.3%) of breakfast skippers was girls. Being a female ($p < 0.05$) and occupation of breadwinner ($p < 0.05$) were associated with breakfast skipping. According to this study, no significant association was identified with breakfast skipping and academic performance of the children in Zonal Education Division-Galle ($p = 0.51$).

Conclusions: Breakfast skipping was identified in considerable proportion among school children in the sample. Although, study did not identify significant association with breakfast skipping and academic performance, study recommend the need of further studies with large samples for detailed assessment on effects of breakfast skipping on academic performance.

Keywords: Academic performance, Breakfast skipping, School children

PP 29

Knowledge and Attitude on Family Planning Practices among Antenatal Mothers Attending Teaching Hospital, Mahamodara, Sri Lanka

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Background: Family planning (FP) practices are common in Sri Lanka. Even though the practices are common, the knowledge and attitudes of antenatal mothers regarding FP practices have not studied well. Considering the wellbeing of their families after childbirth, it is an important area to be explored.

Objectives: To evaluate the knowledge and attitudes on FP practices among antenatal mothers attending Teaching Hospital, Mahamodara (THM)

Methods: A clinic-based, descriptive, cross-sectional study was carried out with 500 conveniently selected antenatal mothers attending THM during September to November 2019. A pre-tested self-administered questionnaire was administered. Knowledge was evaluated with 20 questions while attitude was evaluated with 10 statements. Level of knowledge was categorized as low (0-18), moderate (19-22) and high (23-40). The type of attitude was categorized in to two types as negative (0-25) and positive (26-40). Data were analyzed with descriptive statistics and Chi square test using SPSS version 25.

Results: Majority (57.8%) of antenatal mothers were in 20-30 years age group, Sinhalese (92.6%) and Buddhists (91.2%). Most of them were educated up to G.C.E. (O/L) (48.2%), had a monthly income between LKR 20,000-50,000 (43.8%) and were in primi-parity (41.2%). Mean (±SD) knowledge and attitude scores were 19.54 (±5.43) and 26.20 (±4.18) respectively. Fairly, a high proportion (40.6%) had moderate level of knowledge and 32.0% had low level of knowledge while ethnicity, religion and parity (p <0.001) were significantly associated with the level of knowledge. Sinhalese, Buddhist women with higher parity had significantly higher level of knowledge. Over half of the participants, (58.4%) had positive attitude on FP practices and ethnicity (p = 0.04), religion (p = 0.03) and educational status (p = 0.02) were significantly associated with the type of attitude.

Conclusions: Considerable proportion of antenatal mothers had moderate level of knowledge while nearly one third had low level of knowledge on FP practices. Eventhough comparatively greater proportion of women had positive attitude on FP practices; reasonable proportion had negative attitude as well. Both knowldge and attitude were associated with ethnicity and religion. Further strengthening of the awareness programmes regarding FP practices during antenatal clinic sessions is recommended.

Keywords: Antenatal mothers, Attitude, Family planning practices, Knowledge

PP 30

Knowledge of Bystanders on Pre-Hospital Care Following Physical Trauma

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Background: Physical trauma is a kind of life-threatening physical injury with an increasing health care burden in Sri Lanka. Emergency Therapeutic Unit (ETU) admissions following trauma incidents seem to be increasing nowadays in Sri Lanka. The knowledge and qualities of the first responder or the first person who sees the accident and attends to help the victim, are important to minimize the affecting the victim's conditions or complications following traumatic injury.

Objective: To assess the knowledge of the bystanders on pre-hospital care, in looking after emergency physical trauma patients transport to the hospital

Methods: This was an interview-based cross-sectional descriptive study, conducted in the THK using all bystanders, irrespective of age and gender, of patients who were admitted to the emergency trauma center & ETU at Teaching Hospital Karapitiya, following physical trauma as the study population. Data collection were done using an interviewer administered questionnaire from October to end of November in 2019. Knowledge of the participants was assessed using 07 questions. The total marks scored for the knowledge varied from 0-14 marks. The total knowledge was categorized into three knowledge categories based on the marks obtained; poor (0.0–4.66), moderate (4.67-9.33) and good (9.34-14.00) knowledge. This questionnaire was a self-developed questionnaire and pre-tested with the help of nursing students of FAHS & Nursing school in Galle.

Results: Out of 470 participants, 334 (71.2%) were males. The highest mark scored was 12 and the minimum was 07. Around 34% of the participants obtained 08 marks out of 14 marks. Out of the participants, 2.1% obtained 11 marks out of 14 marks. Maximum marks of 12 were obtained by only 4% of the participants. The mean (±SD) of the total knowledge was 8.162 (±1.075). The majority of the participants (88.1%) were at a moderate level of knowledge of pre-hospital care regarding an emergency physical trauma condition whereas the percentage of poor knowledge was zero. However, only 11.9% of the participants had good knowledge in emergency physical trauma management.

Conclusions: A larger portion of participants has a moderate level of knowledge, rather than a good level of knowledge, on emergency pre-hospital care for physical trauma.

Keywords: Bystanders, Physical trauma, Pre-hospital care

PP 31

Knowledge and Attitude about Human Papilloma Virus, Vaccination and Pap-Test among Female Undergraduates of University of Ruhuna

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Background: Increasing awareness and establishing positive attitudes among young women population on Human Papilloma Virus (HPV), prevention with vaccination and Pap test plays a major role in taking preventive measures, early diagnosis and appropriate management to reduce the burden of cervical cancer.

Objectives: To assess the level of knowledge and attitudes regarding HPV, HPV vaccination and Pap test among female undergraduates of University of Ruhuna (UOR), Sri Lanka

Methodology: A descriptive cross-sectional study was carried out with randomly selected 400 female undergraduates of UOR. Eighty undergraduates were selected from each five Faculties; Faculty of Medicine, Faculty of Allied Health Sciences (FAHS), Faculty of Engineering, Faculty of Management and Finance and Faculty of Humanities and Social Sciences of the UOR. Data were collected using a self-administered questionnaire including questions on knowledge and statements on attitudes related to HPV.

Results: Out of 400 female undergraduates, 44.8% (n = 179) knew that cervical cancer is common in Sri Lanka. Majority, 71.5% (n = 286) knew that cervical cancer is caused by HPV. Most of the undergraduates (63.2%, n = 253) knew about the vaccination against HPV. Majority, (58.8%, n = 235) knew regarding pap-test. The mean (±SD) knowledge score was 18.49 (±11.97). About 38.3% (n = 153) had high, 30% (n = 120) had moderate and 31.8% (n = 127) had low level of knowledge. Overall knowledge was associated with age ($p < 0.001$), ethnicity ($p = 0.04$), faculty ($p < 0.001$) and year of study ($p < 0.001$). Knowledge was significantly higher among female undergraduates who were below 23 years of age in third and final year in the Faculty of Medicine and FAHS ($p < 0.05$). Majority, (51.2%, n = 205) had positive attitudes while 48.8% (n = 195) undergraduates had negative attitudes towards HPV.

Conclusions: Inadequate knowledge and positive attitude regarding HPV, HPV vaccination and Pap test was identified among the female undergraduates of the UOR. The knowledge was related to the age, ethnicity, faculty and year of study. Health education programmes regarding HPV could be important for enhancing the awareness of female undergraduates.

Keywords: Attitude, Female undergraduates, Human papilloma virus, Knowledge, University of Ruhuna

PP 32

Maternal, Fetal Outcomes and Mode of Deliveries of Adolescent Pregnancy: A Descriptive Comparison in Teaching Hospital Mahamodara

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Background: Adolescent pregnancy is a global issue in the world and it is an increasing trend. It is known that adolescent pregnancies have major health consequences for their babies and mothers.

Objective: To compare selected maternal,fetal outcomes and mode of deliveries of adolescent pregnany with adult pregnany

Methods: A hospital based descriptive comparison study was carried out in the post-natal wards of Teaching Hospital Mahamodara (THM), Galle. Hundred adolescent mothers of age between 10-19 years compared with similar number of uncomplicated adult of age between 20 -35 years for selected outcomes. Mothers with chronic illness and multiple gestations were excluded. A pre-tested interviewer administered questionnaire was used to gather data. Data collection tool consisted with basic demographic, perinatal, maternal outcomes and mode of deliveries.

Results: There was no statistically significant difference in Period of Gestation (POG) at delivery. Significantly high number of deliveries with cesarean sections was observed among adults compared to adolescent mothers ($p = 0.003$). Even though adolescent mothers were more likely to develop anemia (38% vs 32%), it was not statistically significant ($p = 0.374$). Pregnancy Induced Hypertension (PIH) (6% vs 3%, $p = 0.306$) and Gestational Diabetes Mellitus (GDM) (9% vs 3%, $p = 0.074$) were frequently occurred in adults than adolescents. But it was not statically significantly difference. There was statistically higher Pre Term Delivery (PTD) rate among adolescents (23% vs 15%). There was no statically significant difference in fetal outcomes (low birth weight *and* PBU admissions) among two groups.

Conclusions: The study found that adolescents were at higher risk of premature delivery than their elder counter-parts. Adult pregnant women were at significantly higher chance of having caesarean deliveries than adolescent pregnancies. But there was no significant risk of development of maternal obstetric complications such as GDM, PIH and anemia and fetal outcomes such as PBU admissions and low birthweight.

Keywords: Adolescent pregnancy, Fetal Outcomes, Maternal Outcomes, Mode of delivery

PP 33

Prevalence and Associating Factors of Chronic Lower Back Pain among Food Delivery Motorcyclists in Colombo District, Sri Lanka

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Background: Food delivery is currently one of the most promising business ideas in E-commerce industry. With the rapid urbanization, food delivery has become prominent due to its easy availability and accessibility which has increased the number of young food delivery motorcyclists.

Objective: To identify the prevalence and associating factors of chronic lower back pain (LBP) among food delivery motorcyclists in Colombo

Methods: A quantitative descriptive cross-sectional study was carried out using convenience sampling technique. Data were collected using interviewer administered questionnaire from food delivery motorcyclists over period of one week. Data were analysed using Microsoft excel version 2018, SPSS and Google forms. ANOVA test was used to determine the significance.

Results: 125 male food delivery motorcyclists were choosen and out of them 30% worked for 7-8 hours a day, for 4-5 days a week. Furthermore, 65% of them had LBP and out of them, 41.4% suffered from chronic LBP. About 46.3% of those having LBP used the CT 100 motorbike ($p = 0.75$). About 83.3% stated that the working duration was reponsible for LBP ($p = 0.092$). Out of those with LBP, 41.4% were between the age of 20-25, 38.2% were between 26-30 and the rest were below 30 ($p = 0.242$). The associating factors of LBP were proven to be insignificant on analysis.

Conclusions: Although many respondents complained of having LBP, the associating factors regards to LBP were proven to be insignificant on analysis. Further researches should be conducted to identify the associating factors of LBP among food delivery motorcyclists.

***Keywords:** Food Delivery Motorcyclists, Lower back pain, Prevalence*

PP 34

Prevalence and Correlated Factors of Chronic Musculoskeletal Pain among Farmers in Nuwaraeliya Divisional Secretariat, Sri Lanka

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Background: Farmers perform most strenuous task and are exposed to a wide variety of occupational risk and hazards. Musculoskeletal pain is recognized as a significant hazard of agricultural occupation. Musculoskeletal pain of the lower back and lower extremities are commonly affected by chronicity and disability.

Objective: To determine the prevalence and correlated factors of chronic musculoskeletal pain among farmers

Methods: A community-based descriptive study was conducted in 2019 using a convenient sample of 369 farmers living in Nuwaraeliya Divisional Secretariat. A pre-tested, interviewer administered questionnaire including factors related to chronic musculoskeletal pain was used in the study. Data were analysed with descriptive statistics and chi-square test using SPSS version 25.

Results: Majority of farmers were in 50-59 years age group (n = 133, 36%) and were males (n = 260, 70.5%). The prevalence of musculoskeletal pain among farmers was 69.9% (n = 258). Frequently experienced sites of pain were low back (n = 130, 50.4%), hip (n = 127, 49.2%) and knee (n = 106, 41.1%). Farmers who were in 50-59 years age group, working in 16 to 25 years, working for more than 8 hours a day and working for 7 days per week had significantly high prevalence of chronic musculoskeletal pain. Chronic musculoskeletal pain was significantly associated with age (p <0.001), gender (p = 0.001), working years (p <0.001), working days for a week (p = 0.012) and working hours in a day (p <0.001).

Conclusions: Prevelence of chronic musculoskeletal pain was high among farmers. The study found that the working years, working hours, working days in a week associated to certain categories of chronic musculoskeletal pain. Findings will be useful for guiding programmes of prevention and management of chronic musculoskeletal pain.

Keywords: Chronic musculoskeletal pain, Correlated factors, Farmers, Prevalence

PP 35

Prevalence of Caffeinated Beverage Intake and Its Association with Serum Uric Acid, Body Mass Index and Gastritis among Undergraduates of University of Sri Jayewardenepura

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Background: Consumption of caffeine is known to exert many health effects and is associated with Serum Uric Acid (SUA), Body Mass Index (BMI) and gastritis.

Objective: To determine the prevalence of caffeinated beverage intake and its association with SUA, BMI and gastritis prevalence among undergraduates aged 20-26 years.

Methods: A cross-sectional study was conducted using 100 undergraduates aged 20-26 years, from the Faculty of Allied Health Sciences of University of Sri Jayewardenepura, using random number table. Information on caffeine consumption (assuming that caffeine content in each cup is equal) and gastritis incidence was assessed using a validated self-administered questionnaire. Three milliliters of whole blood were collected and SUA levels were measured using the Erba XL 100 biochemistry analyzer. Weight and height were measured for BMI calculation. Data analysis were done using SPSS version 25. Results were considered statistically significant at $p < 0.05$.

Results: Prevalence of black tea, brewed coffee and instant coffee consumption were 96%, 83% and 61% respectively. Out of 100 participants, 71% (n = 71) were routine users (≥7 cups/week) while 29% (n = 29) were non-routine users (<7 cups/week or never consumers). Females (89.20%) showed a significantly high prevalence of caffeinated beverages consumption than males (19.20%, $p = 0.000$). The mean SUA level was significantly low among routine consumers (3.81 mg/dL) than non-routine consumers (5.21 mg/dL, $p = 0.000$). Prevalence of gastritis was significantly high among routine caffeine consumers (62.0%, n = 44) when compared with non-routine consumers (34.5%, n = 29, $p = 0.012$). No significant association was found between total caffeine intake and BMI ($p = 0.605$).

Conclusions: This study reveals that, tea is the most commonly used caffeinated beverage and consumption was higher in female students. There was a significant negative association between total caffeine consumption and SUA levels. A positive association between caffeine intake and gastritis incidence was seen. This study did not show any association between caffeine consumption and BMI.

Keywords: *Caffeine, Coffee, Gastritis, Serum uric acid, Tea*

PP 36

Prevalence of Cigarette Smoking among Teenagers in Beruwala Educational Division in Sri Lanka

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Background: Tobacco usage and exposure to tobacco smoke have serious impacts on human health. Although it is most preventable cause of death in the world today, nearly 4 million people die annually from tobacco related causes. In Sri Lanka, prevalence of cigarette smoking among 13-15 years age group was 5.7% and in global, prevalence of cigarette smoking among 16-19 age group was 17.1%.

Objectives: To assess the prevalence of cigarette smoking among teenagers in Beruwala educational division

Methods: A cross-sectional descriptive study was conducted among 640 students of 13-19 years old at randomly selected schools in 1AB category in Beruwala educational division. A pre tested, self-administered questionnaire was used to collect data. Chi-square test was used to assess the associations between the prevalence of smoking and factors that influence the teenagers to smoke.

Results: The responsive rate was 100%. Study population was consisted of 50% of male and 50% of female students. Among them, 200 (31.25%) students were in 13-15 age category and 440 (68.75%) students in 16-19 age category. There were 53 (8%) students who were ever smokers, among them, 3 (0.5%) female and 42 (6.32%) male students were found in 16-19 years age group and 1 (0.02%) female and 7 (0.11%) male students were found in 13-15 years age group. Out of ever smokers, 21 (3.3%) of them had smoked cigarettes during last 6 months and they are currently smoking and all of them were male students in 16-19 years age category. All of the female students (n = 4, 100%) and majority of male students (n = 42, 85.71%) who had smoked at least once, have smoked to get the experience of cigarette smoking. Cigarette smoking behaviour associated with gender (p <0.001, df = 1), age (p = 0.005, df = 1), family income level (p = 0.029, df = 1) and ethnicity (p = 0.315, df = 1).

Conclusions: The prevalence of smoking was relatively high among 16-19 age category. All of the current smokers were found in 16-19 category and were males. Smoking behavior was significantly associated with gender, age and family income level among teenagers in Beruwala Educational Division.

Keywords: *Cigarettes smoking, Prevalence, Teenage smokers*

PP 37

Warming- up before Weight Training: Perceptions and Practices among Young Adults in Ederamulla Urban Council Area, Sri Lanka

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Background: There is a trend nowadays among youth, to participate in gymnasium sessions for exercise and weight training. Prior to weight training sessions, body warming-up is being practiced to prepare the body for a proper training session, as to minimize injuries.

Objective: To study the perceptions and practices on warm-up exercise regimes prior to weight training among young adults

Methods: A descriptive cross-sectional study was done using a self-administered questionnaire with a sample of 122 young adults of both genders within the age range of 16-36. Convenient sampling technique was used to select the participants from weight training centers in Ederamulla Urban Council area. Data were descriptively analyzed using SPSS software and presented using graphs and tables.

Results: The highest percentage of participants were observed at the age of 20 (13.6%) whereas only a few were below 19 or above 31 (0.8%). According to the results, 80.2% represent males and 19.8% are females; which is an average ratio of 4:1 (male: female). The results portray that, out of the total number of participants (n = 110) who engage in weight training, 90.9% follows a warm-up routine prior to weight training, with the commonest exercise type being stretching (53.3%) and 68.9% do follow full body workouts while 30.3% do follow split warm up workouts. Only 42.9% of participants do engage in warmup exercises for 5–15 minutes duration. Nearly half of the participants (48.3%) perceived that warming up would minimize the risk of getting injured while 28.3% of the participants think that it would help in increasing the flexibility of muscles while strengthening.

Conclusions: As the perception towards warm-up exercise is positive since most of the participants perceive that a warm up is really important to minimize the risk of getting musculoskeletal injuries.

Keywords: Cardio/aerobic exercises, Stretching exercises, Warmup exercise, Weight training, Young adults

PP 38

Nurses' Perception on "Do Not Attempt Cardio Pulmonary Resuscitation" Decision Making

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Background: "Do Not Attempt Cardio Pulmonary Resuscitation" (DNACPR) is a difficult and challenging area for many healthcare workers. Nurses are frontline healthcare workers who contribute to the decision-making process. They are required to have a good understanding of decision making of DNACPR.

Objectives: To ascertain the availability of formalized decision-making process, nurse's satisfaction, whether nurses are observed the decision- making process and to experience who have made the DNACPR decision currently

Methods: A hospital-based, descriptive cross-sectional study was conducted using a pre-tested questionnaire. A convenient sample of nurses working in Teaching Hospital Karapitiya was recruited to the study.

Results: A total of 385 nurses were participated. It was noted that 76.1% of the nurses expressed as formalized decision-making process is not available for DNACPR. The 82.3% of the participants reported that they were not satisfied with current methods. Only 84.2% had observed DNACPR decision making process. Results showed nurses never made the decision and only 0.5% observed the patient's family involvement. There were 72.2% of nurses who experienced that doctors did not discuss with nurses while making decision. Data showed nurse's contribution is in very low level for making DNACPR decision. Around 56% of nurses have suggested that patient's decision is required for the decision-making process and 82.3% responded as doctors must do a discussion before deciding action.

Conclusions: Most of the nurses expressed that there is no formalized decision-making process, when DNACPR decision been made and dissatisfied about the current method. According to the nurse's perception, nurses' and patients' contribution for DNACPR is very low.

Keywords: Do not attempt cardiopulmonary resuscitation, Nurses' perception

PP 39

Antimicrobial Activity of Two Selected Medicinal Plant Extracts against *Propionibacterium acnes*

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Background: Acne vulgaris is a common skin condition seen among teenagers and young adults. The severe form of the condition can be distressing, because of pain and skin scarring. The commonest aetiological agent for the condition is *Propionibacterium acnes* (*P. acnes*) (new name – *Cutibacterium acnes*). There are many artificial and natural substances used in the treatment of acne.

Objective: To determine the anti-microbial activity of selected medicinal plants extracts and a mixture of the selected plant extracts against *Propionibacterium acnes*

Methods: Plant parts were collected, oven dried (40 ºC) and were subjected to soxhlet extraction procedure. The fractionated (hexane, ethyl acetate, methanol and aqueous) plant extracts of *Centella asiatica* (Family: Apiaceae, common name: Gotukola) and *Ricinus communis* (Family: Euphorbiaceae, common name: Edaru) were prepared. The main acne causative agent, *P. acnes* was used to determine the anti-microbial activity of the crude extracts of the plants. Agar well diffusion method was used to determine the crude anti-acne activity of all the extracts and the 1:1 mixture of the two extracts against *P. acnes*. Zones of inhibition were measured after 48 hours of incubation under anaerobic conditions. All the testings were triplicated. Minimum inhibitory concentrations (MIC) were detected by microtitre plate method, for the extracts which showed zones of inhibition in plate method.

Results: Zones of inhibition for methanol, hexane, ethyl acetate and water extracts of *Centella asiatica* were 13.00, 13.00, 12.67 mm and for water and for *Ricinus communis* were 12.00, 10.67, 11.00 and 9.33 mm respectively. The zones of inhibition for methanol, hexane, ethyl acetate and water extracts were 12.00, 16.00, 13.30 and 8.67 mm respectively. The MIC of the methanol extract of *Centella asiatica* was 12.5 mg/mL and that of the hexane extract of *Ricinus communis* was 6.25 mg/mL.

Conclusion: Methanol and hexane extracts of *Centella asiatica* (Gotukola) and *Ricinus communis* (Endaru) separately as well as 1:1 mixture exert antimicrobial effects against *Propionibacterium acnes.*

Keywords: Acne, Antimicrobial, Centella asiatica, Propionibacterium acnes, Ricinus communis

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