STURESY 2023

"PIONEERING INNOVATIONS BY YOUNG MINDS SHAPING A BRIGHTER PRESENT, FUTURE, AND BEYOND"

DENTAL STUDENTS' RESEARCH SYMPOSIUM

Book of Abstracts
Volume 2

Dental Students' Research Symposium
STURESY 2023

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Faculty of Dental Sciences

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Prof. S. U. B. Tennakoon

Technical Session II (Poster Presentations)
Prof. B. M. H. S. K. Banneheka
Dr B. R. Fernando
Dr B. K. G. Thilakarathne

Message from the Vice Chancellor

It is with great pleasure that I send this message to mark the Dental Students' Research Symposium - Sturesy 2023 organized by the Faculty of Dental Sciences, University of Peradeniya.

Since its inception, the Faculty of Dental Sciences has continued to produce world class researchers who tremendously contribute to the arena of dental research.

I am confident that this event will give an ideal venue for budding researchers to discuss the findings of their undergraduate research projects with the scientific community, and that this will hopefully serve as a springboard for them to engage in fruitful research in the future.

I take this opportunity to appreciate the Dean and the staff of the Faculty of Dental Sciences and the members of the organizing committee for organizing this event. I congratulate all the presenters on their valuable contributions and wish all of you a productive and memorable experience.

Prof. M. D. Lamawansa
Vice Chancellor
University of Peradeniya

Message from the Deputy Vice Chancellor

It is with immense pleasure that I send this message to the Undergraduate Research Symposium (STURESY 2023) organized by the Faculty of Dental Sciences, University of Peradeniya on August 12, 2023.

Research fueled by curiosity is the driving force of humankind and it is what propels humanity forward. The luxury of life that we enjoy today would not have been possible if not for research carried out generations ago. The discovery made by Sir Alexander Fleming in 1928 was capable enough to prevent millions of patients from infections and possible deaths. The research in the ICT field has brought the Internet of Things, Artificial Intelligence, and Machine Learning which has made life easy. The use of 5G-powered railway communication technology already used in a number of countries has made drastic changes in managing railways.

Over the years, the Faculty of Dental Science has shown continued progress in research. The development of collaborations with foreign universities and research institutions and the establishment of the Center for Research in Oral Cancer (CROC), recognition of the best researchers both at the faculty and university levels might have been attributable to this growth.

The research project helps enormously for the students to develop analytical skills, time and resource management, critical thinking, statistical analysis, reporting, and presentation skills among others. In light of the global pandemic and the economic downturn faced by the country, researchers face a plethora of challenges, however, it is essential for the researchers to continue with the research programs with the same vigor.

I take this opportunity to congratulate the researchers and thank the Dean and the organizing committee for organizing the symposium in the most glamorous manner and the supervisors who guided their students.

I wish the deliberations of the symposium every success.

Professor Terrence Madhujith
Deputy Vice-Chancellor
University of Peradeniya

Message from Dean, Faculty of Dental Sciences

I am deeply honoured to send this message of good wishes as the Dean of the Faculty of Dental Sciences, University of Peradeniya, on the occasion of the Undergraduate Research Symposium 2023. I am delighted to express my appreciation for the continuous commitment and enthusiasm of the faculty in promoting research and evidence-based dentistry.

Remarkably, the current dental undergraduate curriculum continues to include a research component. By encouraging students to engage in research from an early stage, the Faculty of Dental Sciences nurtures inquisitive minds and contributes to their lifelong learning journey as dental professionals.

Research serves as the backbone of progress in any field. I am delighted to see the Faculty of Dental Sciences persist in providing its students with the necessary guidance and impetus in this regard. The dedication and effort the presenters and their supervisors put forth are truly commendable, and I extend my heartfelt congratulations to all of them.

I would also like to express my sincere gratitude to the Chair of the Faculty Research Committee and the organizing team for their unwavering commitment to putting together this symposium. It takes exceptional dedication and teamwork to make such an event successful.

Furthermore, I thank Prof. M. D. Lamawansa and Prof. W. M. T. Madhujith, Vice Chancellor and Deputy Vice Chancellor of the University of Peradeniya, for their continuous support. I am confident that the presence of Keynote Speakers Prof. W. M. T. Madhujith, Deputy Vice Chancellor University of Peradeniya and Dr B. R. Fernando of Department of Veterinary Public Health and Pharmacology at the symposium will inspire and motivate all attendees.

Wishing you all a successful and intellectually stimulating Undergraduate Research Symposium 2023!

Prof. Manjula Attygalla
Dean/Faculty of Dental Sciences
University of Peradeniya

Message from the Chairperson, Faculty Research Committee

It is with great pleasure that I write this message, on the occasion of the Dental Students' Research Symposium- STURESY 2023, which will be held under the theme "Pioneering Innovations by Young Minds Shaping a Brighter Present, Future & Beyond". STURESY-2023, aims to provide a platform for students to disseminate their research findings to a wider audience. This year's symposium consists of 13 oral presentations and 14 poster presentations dealing with a wide range of interesting research topics including "Professional identity formation among clinical and pre-clinical dental students" and "Herbal mouthwash containing *Mimusops elengi* (Munamal) bark extract against supra-gingival plaque bacteria in patients with gingivitis". The ultimate goal of STURESY 2023 is to celebrate students' achievements in research and to highlight the importance of research so that our student population will continue research activities throughout their professional careers.

Two eminent scholars Prof. W. M. T. Madhujith, Deputy Vice Chancellor, University of Peradeniya and Dr B. R. Fernando of Department of Veterinary Public Health and Pharmacology are lined up to deliver keynote speeches on "Planning Research for Better Results" and "Commercialization of University Based Research and Innovations" which will add significant colour to the event.

I would like to thank Prof. Madhavi Paranagama, Chairperson, Scientific and Editorial Committee, Prof. Sumedha Jayathilake, Chairperson, Logistics Committee, and all members of the organizing committee, who worked tirelessly to make this event a success. We greatly appreciate the advice and guidance given by Prof A. M. Attygalla, the Dean, Faculty of Dental Sciences, when organizing the event. Let me wish all presenters "best of luck" and hope that all students will carry fond memories of this symposium.

Prof. Primali Jayasooriya
Chairperson, Dental Faculty Research Committee

Keynote Speech

Planning Research for Better Results

Prof. W. M. T. Madhujith

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Research is undoubtedly what propels humanity forward. Thanks to the research carried out long ago, we have been able to visualize the molecule, utilize nuclear energy, reach out to space, know what happens on the other side of the world instantaneously, and palm over some of our work to AI-based platforms.

Oral health and hygiene are very important for one's overall health and well-being. Dental caries and periodontal diseases are the major oral health issues in the country while oral cancer remains the second commonest cause of mortality among males in Sri Lanka.

Identification of cost-effective materials for dental procedures, the effect of nutrition and oral health, mitigation of antimicrobial resistance, oral health and systemic diseases, the use of ICT, computer-assisted and robotic technologies in dentistry, the use of nanotechnology for diagnosis, treatment, and prevention of oral diseases sociological aspects of oral health are some of the possible priority areas that the budding researchers can focus on.

Research has to be planned well to achieve a good outcome and this becomes essential, especially in resource-poor settings. It is vital to identify a researchable question carefully taking national priorities into account. Multi-disciplinary research is promoted as it introduces new dimensions to the work which otherwise would have been looked at from one angle only. Many funding agencies nowadays look for the multi-disciplinary nature of projects. A thorough literature survey is essential to avoid repetition, choosing the best methodologies, and avoiding pitfalls. This includes not only referring to journals and reports but also discussing with experts in the field. Choosing the right information in a sea of records needs is an art that researchers need to develop. The novelty of the research is helpful in publishing research as journals always look for novel research. Moreover, mere duplication is an utter waste of resources without much novelty. It is always better to use the latest methods with a high degree of precision and accuracy; however, the latest methods may not be available in the country. Method validation is also important in many instances, however, quite often researchers tend to forget validating methods.

Consulting a statistician is vital during the planning process of the research project. Nonetheless, many researchers consult statisticians toward the end of the research. Seeking the statistical assistance after gathering data is quite often not very helpful as by this time some of the most important data might have been missed out. The experimental design has also to be finalized during the planning stage. Obtaining ethical clearance for human and animal related research is extremely important. This may take a few weeks, therefore, it is a good idea to apply for ethical clearance well in advance.

Keynote Speech

Commercialization of University-Based Research and Innovations

Dr B. R. Fernando

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Scientific research is often expected to provide a considerable impact on the general public beyond the needs of the researchers and the research institutes such as universities. As a result, most of the countries make a substantial investment on research and development (world average 2.62% of the GDP: World Bank, 2022) activities to ensure that research will support technological progress, government function, basic human curiosity etc. However, a fraction of the society question whether the public investment in science can match the public interest in science. The gap in knowledge and interests between scientists and policymakers may disconnect the use of knowledge created by scientific research from policy insights which was quite evident in the recent past in Sri Lanka leading to multiple issues. Therefore, the university community should start a dialogue with policy makers and investors to work out effective mechanisms for providing benefits of investment made on research and development activities to the general public.

Scientists may have discipline specific interests, with varying degrees of exposure to real-world problems. Their research may perhaps be driven merely by incentives such as publications, citations and more funding opportunities etc. Scientists need to walk an extra mile out of their comfort zone to transform his/her new knowledge into a commercially viable product or service which can directly benefit the society. In this journey, there are many obstacles to be overcome including securing funds to develop the initial invention to a market-ready product or service, protecting intellectual rights and the high cost of such endeavors, finding the most suitable investor and negotiation, dealing with less flexible and time-consuming university level red tape, and most importantly national policies with very limited to no incentives for the local manufacturing industry.

Although Sri Lanka's investment in research is relatively low (0.13% of the GDP in 2022), in the recent past several commendable initiatives have been taken to promote commercialization of innovations of the Sri Lankan universities and to overcome above mentioned limitations. These efforts must be backed up with certain policy reforms in the country that are essential to encourage private investments in the commercialization of innovations.

Programme

8.15 a.m.   Arrival of guests

8.30 a.m.   Opening ceremony

8.40 a.m.   Welcome address by Prof. A. M. Attygalla
               The Dean, Faculty of Dental Sciences

8.50 a.m.   Speech by the Chief Guest, Prof. M. D. Lamawansa
               The Vice Chancellor, University of Peradeniya

9.00 a.m.   Keynote Speech by Prof. W.M.T. Madhujith,
               Deputy Vice Chancellor, University of Peradeniya
               "Planning Research for Better Results"

9.30 a.m.   Vote of Thanks by Prof. P. R. Jayasooriya
               The Chairperson, Faculty Research Committee

9.35 a.m.   Refreshments

10.00 a.m.   Technical session I - oral presentations

12.15 a.m.   Lunch

1.00 p. m.   Technical session II - poster presentations

2.30 p.m.   Keynote Speech by Dr. B.R. Fernando, Senior Lecturer in Veterinary
               Public Health and Pharmacology
               "Commercialization of University-Based Research and Innovations"

3.15 p.m.   Awards ceremony

3.30 p.m.   Closing ceremony

List of Abstracts

Technical Session I
Oral Presentations (10.00 am – 12.15 am)

Technical Session II
Poster Presentations (1.00 pm – 2.30 pm)

Technical Session I - Oral Presentations

Analysing Professional Identity Formation among Clinical and Pre-Clinical Dental Students of the University of Peradeniya

M. W. Rusthum[1], O. P. K. Ruwanthika[1], *S. C. Samaraweera[1], J. A. C. K. Jayawardena[2]

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Professional Identity (PI) is how a person defines himself in a professional role regarding attributes, beliefs, values and experiences. Professional identity formation (PIF) is relatively unexplored in Sri Lanka. In medical education, PIF has arisen to identify how a student transforms into a competent and compassionate physician with professional behaviour. Almost all Sri Lankan dental undergraduates have been selected to study dentistry, which was not their first choice. Therefore, it is crucial to study how and to what extent PI forms within dental undergraduates.

The main objective of this study is to determine PIF among dental students of the University of Peradeniya using psychometric analysis.

A cross-sectional study was conducted among 447 dental undergraduates of the Faculty of Dental Sciences in the University of Peradeniya. Professional Identity Status Questionnaire (PISQ-5d) was used for data collection. The self-administered questionnaire was distributed online in English/ Sinhala and English/ Tamil. The validity of the tool was confirmed with factor analysis and internal consistency tests. Scores for PIF were calculated for each student and batch based on the results of factor analysis. PIF scores were compared between batches using the Kruskal-Wallis test.

Factor analysis resulted in a model of four factors: Affirmation, Practices, Identification with commitment and Reconsideration of commitment. The in-depth exploration factor was not observed. A significant difference in PIF scores among batches was observed ($p<0.001$). The median PIF score was highest among the first years (65.00), followed by the second (61.00), fifth (60.00), fourth (58.00) and third years (57.00). The Practices score was highest among fifth-year students (15.00).

As the in-depth exploration factor was not depicted in the PIF of the dental students, investigation of reasons and devising of appropriate solutions is recommended. The variation of the PIF scores among batches proposes appropriate changes in the curriculum during revisions.

Keywords: professional identity, professionalism, dental students, curriculum reform

Factors Influencing the Perception and Participation of Dental Professionals in Continuing Professional Development in Sri Lanka

R. M. I. N. Rathnayake[1], R. M. Y. P. Rathnayake[1], V. D. R. M. Rathnayake[1], *N. S. Soysa[2]

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Continuing Professional Development (CPD) ensures that dental professionals uphold the benchmarks of clinical proficiency while staying updated with advancements in the field. This study aimed to assess how Sri Lankan dentists perceive and engage in CPD. A cross-sectional study was performed on dental practitioners who are registered under the Sri Lanka Medical Council and actively practice within Sri Lanka. Data collection utilized a self-administered questionnaire distributed via a Google Form. Statistical analysis involved employing the chi-square test along with descriptive statistics using the SPSS software.

A total of 320 responses were received, resulting in a response rate of 18.3%. The predominant proportion of respondents were females (56.6%), and the age group between 31 and 50 years constituted the largest proportion (58.8%). A notable portion of dentists practiced in Colombo (27%). Notably, 88.8% of the dental professionals had taken part in CPD activities within the preceding 5 years. 91.6% of the surveyed individuals expressed their willingness to engage in CPD programs over the next 2 years. The field of restorative dentistry (69.4%) emerged as the most favored clinical discipline among respondents. The principal motivation for attendance was the enhancement of knowledge. The primary advantage of participating was gaining insights into novel treatment techniques (90.8%). Among the barriers faced, location stood out as the predominant barrier (81.1%). An overwhelming majority of dentists (97.10%) concurred that CPD is crucial for maintaining safe clinical practices.

To the best of our knowledge, this is the first study that has evaluated the perception and engagement of dental practitioners towards CPD in Sri Lanka. The findings of this study distinctly highlight a favorable outlook among dentists towards CPD. These results underscore the need for additional research to shape a substantiated verifiable CPD framework.

Keywords: CPD, dental practitioners, participation, benefits, barriers

Perceived Academic Stress (PAS), Coping Mechanisms and Effects of PAS on Academic Performances among Undergraduates in University of Peradeniya

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Academic activities could be a common reason causing stress in university students which may also influence their academic performance. The coping capability for such events depends on the perceived level of stress and the adaptive capacity of that individual.

This study aimed to evaluate the perceived academic stress (PAS), its effects on their academic performances (AP) and the various coping mechanisms of undergraduates at University of Peradeniya. The sample resembled probability proportionate to the number of students within each faculty. Data were collected using a self-administered, pretested questionnaire via online mode. The PAS levels were assessed with a 5-point Likert scale. Descriptive and inferential statistical analysis was done using IBM SPSS version 25 software.

The mean age of the study population was 24 ± 1.967 years and the majority were females (60.3%, n=305). The overall stress score was high (mean 54.5 ± 9.9) and the female students had a significantly higher PAS mean score compared to the males. No significant difference was found in the PAS scores among the students following health-related courses compared to non-health-related courses (Mann-Whitney U test, p=0.393). However, AP based on Grade Point Average values showed a significant inverse relationship with the PAS score (Mann-Whitney U test, p=0.025). Among the physical symptoms associated with stress, the most common was headache (n=66.6%) followed by sleep disturbances (55.7%). Highest rated coping mechanisms were talking to family or friends (73.9%) followed by listening to music or songs (69.8%) and watching YouTube videos that are not related to academics (61.7%).

These findings could be considered in improving the delivery of the study programmes in a favourable learning environment and in planning stress management strategies for students. Targeted interventions should be developed to support students in managing PAS effectively and improving their overall academic performance. Further longitudinal, multi-centered studies would be more beneficial to assess these aspects in different learning environments and study streams.

Keywords: academic performance, coping mechanisms, perceived academic stress

Comparison of Copper Content in Oral Epithelial Cells of Betel Chewers with and without Oral Submucous Fibrosis

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Copper has been implicated in the pathogenesis of Oral Submucous Fibrosis (OSF). Chewing areca nut is considered as a main etiological factor for OSF while areca nut is known to possess high levels of copper.

The aims of the study were to evaluate copper in exfoliative oral epithelial cells of betel chewers with and without OSF and to identify whether copper content varies depending on duration, quantity of chewing, components of betel quid and clinical stage of OSF. Cytological specimens of 60 betel chewers with and without OSF and 10 healthy individuals were stained with Rhodanine. Stained sections were evaluated for the presence of copper both qualitatively and quantitatively. Statistical analysis was performed with Chi square test considering $p<0.05$ as significant.

As the majority of patients had epithelial cells stained in dark brown and orange color, no statistically significant differences were observed with respect color of the cytoplasm of cells in betel chewers with and without OSF (p=0.860). However, statistically significant number of OSF patients (86%) showed an abundant/ variable number of copper granules in the cells compared to the control group without OSF (20%) (p=0.0001). The numbers of copper granules present were not dependent on quantity, duration of chewing or components of the betel quid and clinical stage of disease. Similarly, smoking or alcohol use also did not influence the quantitative assessment of copper.

The study reveals that it is possible to differentiate OSF patients from betel chewers without OSF using the number of copper granules present in the cytoplasm as a diagnostic criterion. As the amount of copper present in cells is not dependent on quantity, duration of chewing and components of betel quid, it shows promise to be developed as a non-invasive diagnostic technique for OSF, with further investigations and after validating it with a larger number of patients.

Keywords: OSF, copper content, betel chewers, areca nut

Perceived Barriers for University Education and Its Impact on The Academic Performance of Dental Undergraduates in the Faculty of Dental Sciences, University of Peradeniya

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Perceived barriers can be defined as a person's estimation of the level of challenge of personal, social, environmental and economic obstacles to a specified behavior or their desired goal status on that behavior. Perceived barriers related to university education are considered as major challenges for academic performance in university students.

The objectives of this study were to determine the perceived barriers to university education and its impact on the academic performance of dental undergraduates in the Faculty of Dental Sciences, University of Peradeniya (FODS UOP). This was a descriptive cross-sectional study conducted among 2nd, 3rd, 4th and 5th-year dental undergraduates in the FODS, UOP. A self-administered online questionnaire was used for data collection. The questionnaire was developed based on literature findings and expert opinion. The questionnaire assessed 17 types of barriers whereas GPA score at the last end-semester exam held was considered as a proxy measure to measure academic performance. The impact of perceived barriers on academic performance was analyzed using Mann Whitney U test.

Out of 346 dental undergraduates, the response rate was 95%. Key perceived barriers identified in the study included parental education level, family income, transition from school to university education, language proficiency, risk behaviors, gender, support from friends, teachers and mentors, relationships, place of residence, extracurricular activities, and workload. Transition from the school education to university education ($p<0.05$) and insufficient English proficiency to ask and answer questions ($p<0.05$) were significant barriers which impacted the academic performance of the dental undergraduates. Conversely, a major proportion did not consider 'involving in extra-curricular activities' as a barrier and academic performance was higher among those who perceived it as 'not a barrier'. This association was statistically significant ($p<0.001$).

The present study findings would be helpful for improved delivery of the programme and to establish support systems for the undergraduates to perform at their level best.

Identifying the Barriers for Prosthetic Rehabilitation of Missing Teeth by the Adult Patients Attending Dental Hospital Peradeniya

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Teeth are important for oral functions and esthetics. It's necessary to manage missing teeth for better quality of life. By identifying barriers for prosthetic rehabilitation, we can determine the needs, limitations, and knowledge about treatment options among patients.

The objective of this study was to identify the barriers for prosthetic replacement of missing teeth in adult patients who attended the Dental Hospital Peradeniya (DHP). A descriptive cross-sectional study was conducted in 200 patients who visited the DHP aged above 18 years with missing teeth (excluding 3rd molar). Data were collected using a pre-tested self-administered questionnaire and clinical oral examination, which included identification of missing teeth, position of edentulous spaces, and the Kennedy classification of the arch. Data were statistically analyzed using Minitab (v18.0) software.

The mean age of participants was 46.35 years. Among them, 71.5% (143) had problems due to missing teeth. Out of this, 81.12% suffered from chewing difficulties. Ninety six percent of the patients (192) were aware that edentulous spaces can be replaced by artificial teeth. The main reason for not replacing the missing teeth was financial concerns. The majority were only aware of the complete dentures and removable partial dentures. Government hospitals, verbal communication, and observing the users of dentures were significant sources of information about them. There was a significant association between demographic data and the non-replacement of missing teeth ($p < 0.05$). Socioeconomic status and age have a significant influence on the non-replacement of missing teeth ($p < 0.05$).

Financial difficulty was the main barrier for prosthetic rehabilitation. Lack of need, lack of time, and poor knowledge about treatment options were also identified as barriers. Many people knew that the space between the teeth can be replaced, but they didn't have adequate knowledge about different treatment options.

Keywords: prosthetic rehabilitation, cross sectional study, edentulous, dentures

Tooth Coronal Index on Digital Panoramic Radiographs as a Tool for Age Estimation in a Cohort of Sri Lankan Adults

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Teeth are essential biological markers used to estimate a person's age and play a crucial role in forensic identification.

The objective of this study was to assess the reliability of age estimation using the tooth coronal index (TCI) of mandibular premolars and molars (excluding third molars) observed in digital panoramic radiographs (DPT).

A retrospective study was performed using DPTs of 597 individuals of Sri Lankan origin, aged between 18 to 60 years. Only high-quality radiographs with good contrast, free from distortion or artifacts, and displaying visible tooth and pulp contours with proper morphology in selected teeth were included. The crown height (CH) and the height of the coronal pulp cavity (CPCH) of mandibular premolars and molars were measured to calculate the TCI. The actual age of each subject was then compared with the TCI of the respective tooth.

The correlation coefficient values (r) for the left first premolar, left second premolar, left first molar, left second molar, right first premolar, right second premolar, right first molar, and right second molar were 0.015, 0.029, -0.077, 0.004, 0.023, 0.042, -0.078, and -0.014, respectively ($p > 0.05$). This indicates weaker correlations and no statistically significant differences between the age and TCI of the mandibular premolars and molars. Additionally, there is no significant correlation between TCI and the patient's age for both genders (Males r = -0.088 to 0.06, Females r = -0.056 to 0.095) ($P > 0.05$). However, a statistically significant difference ($p < 0.001$) exists between all premolars and molars of TCI values. Moreover, a statistically significant ($p < 0.05$) difference is observed in the population median of TCI values between the right and left mandibular second molars.

Despite its potential, TCI cannot be used to develop age estimation for the Sri Lankan population without further analysis and research. Limitations such as variations in the physical parameters of the computer display, radiographic methods used, and sample sizes between parallel studies must be considered. Nonetheless, this study emphasizes the significance of considering specific teeth when utilizing TCI for forensic purposes.

Keywords: TCI, DPT, age estimation, forensic evaluation

Dental Anxiety Among Pregnant Women in Yatinuwara MOH Area, Kandy District, Sri Lanka

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Maintaining optimal oral health during pregnancy is essential for avoiding adverse pregnancy outcomes. Dental anxiety (DA) is a major barrier to accessing necessary oral care during this critical period.

This study aimed to assess the prevalence of DA while exploring its associated factors among pregnant women attending antenatal clinics in Yatinuwara MoH area, Kandy district, Sri Lanka.

A mixed-method approach was used. First, a cross-sectional survey was conducted with 138 pregnant women attending antenatal clinics in Yatinuwara MoH area, utilizing an interviewer-administered questionnaire and the Modified Dental Anxiety Scale (MDAS). Secondly, the inductive methodology was used to explore the factors associated with DA in more detail using structured interviews. This was done until the point of data saturation with the women who exhibited MDAS score ≥ 19. Descriptive analysis, inferential statistics, and content analysis were used during quantitative and qualitative analyses, respectively.

Severe DA was found in 15.9% of the pregnant women, while mild DA was 70.3%. The mean MDAS score was recorded as 12.6±4.7. Monthly household income, ethnicity, and the presence of pregnancy-related complications were associated with maternal DA. Three common thematic factors associated with DA were identified: (1) anxiety related to the dental setting, (2) anxiety towards the behaviour of the dental team, (3) women's perceptions and previous experiences of dental care.

Though the prevalence of severe DA was low in this study population, the prevalence of total, mild, and moderate anxiety was considerably high. The results suggest that consideration of individual factors, women's perceptions, and previous dental care experiences would help manage maternal DA. Further, creating a pleasant treatment environment with a friendly healthcare team might minimize the DA and thereby maximize women's presence for dental care during pregnancy.

Keywords: dental anxiety, MDAS, oral health, pregnancy, Sri Lanka

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Evaluation of Morphological Characteristics of the Mental Canal of a Sri Lankan Population Using Cone Beam Computed Tomography

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Mental foramen (MF) is a small bilateral opening in the mandible located in premolar region. It transmits mental nerve (MN), along with its artery and vein. Since anatomical variations are possible, it is important to know the exact location to avoid neurovascular bundle damage and MN paresthesia during dental procedures.

This study aimed to assess the morphology and variations of the MF in a Sri Lankan population attending University Dental Teaching Hospital Peradeniya (DTHP) using Cone Beam Computed Tomography (CBCT) during March 2021 to March 2022.

The study was conducted using 67 CBCTs (male-25 female-42) aged between 18 to 40 years with clearly recorded, fully erupted mandibular permanent teeth, without any anomalies.

MF was present in all mandibles and one clinically important finding was having five Accessory MFs. Average horizontal and vertical diameters were 3.30 mm and 3.01 mm respectively. Mean vertical diameter was significantly higher in males ($p=0.0003$). The mean distance from the lower border of mandible to MF was 11.55 mm and 11.66 mm on right and left respectively with males having higher length. The shape and the direction of MF were suggestive of literature having majority of oval foramina (73.6%) opening in postero-superior direction (82.8%). The most common position of MF was below root apex and, in contrast to literature, majority was at the second premolar (55.95%). Presence of incisive canal was 100% and 23 (14.9%) anterior loops were observed, suggesting the importance of using CBCT in clinical assessment.

In conclusion, as population variations are possible in mental region, sound knowledge on anatomy and pre-surgical assessment using CBCT is utmost important in clinical practice. It is also suggested of further studies in larger scale in this region of the mandible.

Keywords: Mental canal, Mental foramen, CBCT

Behaviour Management Techniques Used on Paediatric Dental Patients by Seventh Semester Dental Undergraduates of University of Peradeniya

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Behaviour management techniques (BMT) are an essential element in the practice of Paediatric Dentistry. There is a need to adapt the best method of BMT according to the situation. Therefore, it is important to enhance dentists' knowledge and proficiency in employing BMT.

This study aimed to investigate application, effectiveness and potential barriers towards BMT used in paediatric dental patients by seventh semester dental students at the Faculty of Dental Sciences, University of Peradeniya. Additionally, the study assessed the general feedback of parents regarding BMT used by dental students.

This cross-sectional descriptive study was conducted by collecting 48 questionnaires from dental students which assessed widely used BMT, effectiveness of common BMT and potential barriers in using BMT. Also, 40 feedback forms were collected from parents.

The study included 32 female (66.7%) and 16 male (33.3%) students. The majority of students (89.6%) have used BMT. Out of them, Tell-Show-Do (TSD) was the most commonly used technique (41.7%), followed by distraction with questions/ story telling (16.7%). Modelling (2.1%) and distraction with a video clip (2.1%) were the least utilised. TSD was the most effective BMT (22%) and other methods such as positive reinforcement (21%), distraction (19%), stop signalling (19%) and modelling (18%) were nearly equally effective. Barriers towards using BMT were the child's past dental experience, followed by language barrier. The most used BMT was not significantly associated with the gender of the operator, the gender of the patient or the treatment procedure. Parental feedback indicated a positive response for BMT used by dental students.

Multiple BMT showing comparable effectiveness suggests that dental undergraduates have diverse effective options in addition to the commonly practised TSD method. Furthermore, to enhance treatment delivery for paediatric patients, potential barriers towards BMT should be addressed.

Keywords: behaviour management techniques, cross-sectional study, dental undergraduates

eHealth Literacy and the Use of Internet and mHealth Applications in Health Information Seeking Among Patients Attending the Dental Teaching Hospital, Peradeniya, Sri Lanka

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The Internet and mHealth Apps are emerging means for the transmission of health information. No studies concerning eHealth literacy, Internet or mHealth Apps utilisation have been conducted among patients with dental problems in Sri Lanka.

This study aimed to examine eHealth literacy and associated factors, and the use of the Internet and mHealth Apps in health information seeking among patients attending the Dental Teaching Hospital, Peradeniya, Sri Lanka (DHP).

A cross-sectional survey was conducted among a stratified sample of 373 patients with dental problems via an interviewer-administered questionnaire, which consisted of socio-demographic data, eHealth Literacy Scale (eHEALS), and questions related to Internet and mHealth App use. In data analysis, descriptive statistics, the Mann-Whitney U-test, and the Kruskal-Wallis H test were computed.

The mean age of the participants was 39.52 years (SD±15.683). The mean eHealth literacy score was 26.65 (SD ± 6.808), of which, a majority (60.6%) reported high eHealth literacy levels. Many reported inadequate skills in identifying high-quality health information (57.6%). A majority (70%) were found to use the Internet for health information seeking, while most (85.3%) did not use mHealth Apps. Younger age (p <0.001) and higher level of education (p<0.001) were positively associated with eHealth literacy according to the Kruskal-Wallis H test. Internet use (p<0.001) and mHealth App use (p<0.001) were positively associated with eHealth literacy according to the Mann-Whitney U-test.

More than half of the patients attending the DHP possess adequate eHealth literacy skills. Patients with dental problems, especially those of advanced ages and low educational levels, need to be educated on using eHealth for health information seeking, especially, differentiating high-quality and low-quality information.

Keywords: eHealth literacy, mHealth Apps, internet, dental patients

Knowledge, Attitude and Practice of Emergency Management of Tooth Avulsion Among School Dental Therapists and Trainee School Dental Therapists in Sri Lanka

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Tooth avulsion, which accounts for 16% of all dental trauma is one of the most severe forms with a wide array of consequences affecting dental and overall development of children. The prognosis of an avulsed tooth depends on appropriate emergency management. So, knowledge, attitude and practice regarding emergency management of an avulsed tooth are very important to ensure good prognosis and treatment outcomes.

This descriptive cross-sectional study aimed to assess the knowledge, attitude, and practice of emergency management of tooth avulsion among SDTs and trainee SDTs in Sri Lanka. Pre-tested, self-administered questionnaires were distributed among trainee SDTs (54), who were in the SDTs training school Maharagama and SDTs (360), who were working in island-wide school dental clinics. Collected data were initially analyzed using descriptive statistics. The Kruskal Wallis and Mann Whitney U tests were used to determine the relationship between different variables and Spearman's correlation coefficient determined the correlation between two populations with the aid of SPSS version 28.

Only 65.83% SDTs and 87.03% of trainee SDTs had participated in the survey. The majority of SDTs (86.5%) stated 75%< of correct answers while the majority of trainee SDTs (55.3%) scored between 50-75% and that knowledge was gained mainly through their training program. Only a few (7.6%) of SDTs and 25.5% of trainee SDTs knew the best storage medium for an avulsed tooth. Only 79.3% of trainee SDTs and 85% SDTs knew the replantation should be carried out within 60 minutes for a better prognosis. Among 152 of SDTs came across avulsion cases, only 7 had tried for replantation. Regarding attitude, 99.2% of participants of SDTs and all (100%) trainee SDTs were interested in receiving more information about emergency management of tooth avulsion.

This study found that SDTs had high knowledge while trainees had average knowledge about emergency management of tooth avulsion. The knowledge on storage media for tooth avulsion and extra-oral dry time were weak areas for both groups. SDTs showed less than satisfactory practice of tooth replantation after avulsion. This study highlights that knowledge of SDTs on emergency management of tooth avulsion should be reinforced in weak areas and better be updated periodically according to international trauma guidelines to ensure a better prognosis of an avulsed tooth.

Keywords: dental trauma, avulsion, emergency management, school dental therapists, trainee school dental therapists

Quantitative Assessment of Facial Asymmetry Using a Computer Aided Tool

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Face is the most powerful identifier in social recognition and facial symmetry is a very important parameter related to attractiveness. However, genetic, developmental and iatrogenic factors may contribute to facial asymmetry. The perception of facial asymmetry varies greatly among individuals, making it a subjective phenomenon. Among various techniques available to measure facial asymmetry, measurement on digital photographs is the most cost-effective and least harmful method.

The general objective of this study was to quantitatively assess facial asymmetry using a computer-aided tool. Specific objectives were to evaluate the degree of facial asymmetry among the undergraduates of the University of Peradeniya, and to evaluate the agreement between the qualitative analysis with the quantitative measurement.

A descriptive cross-sectional study was conducted with 320 undergraduates between 21-25 years. Those who underwent surgical and orthodontic treatments and students with facial obscures were excluded. Frontal facial photographs were captured using a mobile phone on a tripod. Facial stability was achieved using a wooden frame. The degree of facial asymmetry was marked on a Likert scale by an orthodontist and subjects. The developed computer program using python programming language calculated the facial asymmetry index(FAI) when two lines from outer canthus of the eye to the corner of the mouth were drawn.

A moderately high correlation (+0.55, $p<0.001$) was observed between the expert assessment and the FAI. However, there were weak correlations between layperson and expert assessment (0.037, $p = 0.517$) as well as layperson's judgement and FAI (-0.020, $p = 0.725$). The study concluded that the developed user-friendly computer-aided program is in good agreement with the expert's assessment.

Keywords: facial asymmetry, facial asymmetry index, computer-aided program, frontal facial photograph

Technical Session II - Poster Presentations

Knowledge About Cleft Lip and Palate and Its Management Among Parents of Children Attending the Cleft Center at the Dental Teaching Hospital, Peradeniya

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In Sri Lanka, annually about 400 babies are born with CLP (Cleft Lip and/or Palate). A multidisciplinary team involves in providing comprehensive care to these children. To utilize the facilities provided by the country's healthcare system, parental awareness on the management of CLP is important. This includes parental awareness of feeding, maintaining good oral hygiene, providing nutrition, and attending regular follow-ups, ability to detect any complications faced by the child, appropriate management, and timely referral to professional treatment.

A descriptive cross-sectional study was conducted at the Cleft Center, Dental Teaching Hospital, Peradeniya with 65 participants to evaluate the knowledge about CLP and its management among parents of children attending the Cleft Center. A semi-structured questionnaire was formulated to achieve the study objectives. A predefined 65-point scale was used to assess the knowledge of the participants. A socioeconomic class scale was developed to classify participants into socioeconomic positions based on their education level, occupation, and income. Chi-square test was performed to determine the association between socioeconomic position and knowledge level. A p-value of <0.05 was considered statistically significant.

A significant proportion totaling 74% had never heard of CLP prior to the child's birth. Among those who had pre-existing awareness of the condition, 50% mentioned that awareness had been gained through a known person with CLP. Mass media and social media had an equal contribution (20%) as sources of knowledge on CLP, followed by maternal and child health clinics (10%). At the time of questionnaire administration, a majority of participants (71%) possessed an overall moderate knowledge level, 3% had a good knowledge level and 26% had a poor knowledge level. There was no statistically significant association between socioeconomic position and knowledge level (p=0.221).

Our research findings revealed a considerable inadequacy of knowledge about CLP and its management among the majority of parents. This highlights the need for improved awareness efforts within and beyond the clinical setting.

Keywords: cleft lip and palate, knowledge, socioeconomic status, sources of knowledge

Analysis of the Effectiveness of Aqueous Extract of Ranwan Katu Karandu (*Barleria lupulina* Lindley*)* Against Some Oral Ulcer Causing Bacteria

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Over the years, several medicinal plants have been used for various purposes due to their antimicrobial properties. Due to the adverse effects of synthetic drugs, it has currently become a necessity to analyze the efficacy of herbal products to develop safe, effective, and affordable antimicrobials.

The objective of this study was to analyze the effectiveness of the aqueous extract of Ranwan Katu Karandu (*Barleria lupulina* Lindley) against some oral ulcer-causing bacteria such as *Staphylococcus aureus* & *Pseudomonas aeruginosa.*

An experimental laboratory study was conducted at the microbiology laboratory of the Faculty of Dental Sciences, University of Peradeniya over 48 weeks. The crude extract of *Barleria lupulina* Lindley was prepared through freeze-drying method of extraction and different concentrations of the aqueous extract were prepared by diluting with distilled water. Through preliminary studies, 100,000ppm concentration was selected as the suitable dilution for the study. One standard isolate (NCTC-10662) and 23 clinical isolates of *Staphylococcus aureus* and one standard isolate (HCTC-6571) and 4 clinical isolates of *Pseudomonas aeruginosa* were tested against the plant extract using agar well diffusion assay on MHA plates using positive controls, Fusidic acid against *Staphylococcus aureus* and Gentamicin against *Pseudomonas aeruginosa.*

Positive results were given only against *Staphylococcus aureus* as 62.5% of the isolates showed clear inhibitory zones. *Pseudomonas aeruginosa* didn't give any results in this study.

Therefore, Ranwan Katu Karandu extract can be used as a potential anti-staphylococcal agent, especially against *Staphylococcus aureus.* The antibacterial activity of the aqueous extract of the plant is noteworthy for the treatment of oral ulcers caused by *Staphylococcus aureus.*

Keywords: *Barleria lupulina* Lindley, aqueous extract, oral ulcers, bacteria, anti-microbial

A Clinic-Based Study to Determine Patient Profile, Out of Pocket Expenditure and Time Taken to Obtain Treatment from Undergraduate Dental Students at the Dental Teaching Hospital, Peradeniya

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The inefficiency in time and cost management is one of the main reasons which draws back in dental health care system. Hence, it is imperative that such inefficiencies be systematically identified and eliminated to maximize the efficiency of care.

This study aimed to assess the time duration spent for various clinical and non-clinical activities and cost during the visits to the various departments treated by undergraduate dental students. A cross-sectional observational descriptive study was conducted among 400 patients treated by undergraduate dental students, using an interviewer assisted self-administered questionnaire.

There was a statistically significant difference in the waiting time of patients among various departments. Few procedures done by various clinical year students had significant time differences, such as the time taken for history and examination and master impression between fourth and fifth year students, and history and examination between third and fourth year students. The patients visiting UGs were from a mean distance of 19.761 km from the Dental Teaching Hospital, Peradeniya. The mean cost per visit was Rs. 247.10, and the mean time spent to obtain any kind of considered treatment was 175.4 minutes. On the first visit, patients spent a mean time of 49.01 minutes to come to the clinic after reaching the hospital, and a mean time of 36.75 minutes outside the clinic before being called in. More females sought dental care than males, and the main mode of transport to the hospital was public transport.

Our study concludes that patients incur significant cost and time for each visit. Therefore, it becomes important to consider these factors when planning and delivering dental care.

Keywords: waiting time, cross sectional study, out of pocket expenditure, undergraduates

Growth and Development of Children with Cleft Lip and Palate Until Two Years of Age Who Underwent Primary Surgery at Dental Teaching Hospital, Peradeniya

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Growth and development are important indicators of health in children. Children with cleft lip and/or palate (CL/P) have multiple factors that influence growth and development. Understanding their growth and developmental patterns are useful to detect problems and plan optimum care enabling them to lead a near-normal life.

The objective of this study was to assess the pattern of growth and development of non-syndromic children with CL/P who underwent primary surgery at Cleft Centre, Dental Teaching Hospital, Peradeniya from January 2020 to December 2021.

A retrospective descriptive study was conducted using secondary data on growth and developmental parameters collected from Child Health Developmental Records (CHDR) of 52 children with CL/P. Values of standard growth curves in CHDR were considered as control in this study. Statistical analysis was performed with SPSS 22.0.

There was no statistically significant difference in the rate of weight gain between the control and study group. There was a statistically significant association between the type of cleft and weight gain ($p=0.03$, $p<0.05$). Further, there was a statistically significant difference between the type of cleft and speech ($p=0.05$, $p \leq 0.05$). Out of four cleft types (isolated complete cleft lip, isolated incomplete cleft lip, isolated cleft palate, cleft lip with cleft palate) children with both cleft lip and palate (45.83%) showed the lowest weight gain. Only 25% of the subgroup of cleft palate with/without lip showed delayed speech. Other developmental parameters did not show any statistically significant association with the cleft or the type of cleft in this study population.

Most of the children in this study have near-normal potential for growth and development. Hence this study would enable parents and caregivers to understand the importance of screening and monitoring, early detection of impairment of growth and development, timely intervention, and management of correctable problems in children with non-syndromic oral clefts to ensure a normal or near-normal life.

Keywords: cleft lip, cleft palate, growth, and development

The Factors Associated with Headaches Among Sinhala-Speaking Dental Students of the University of Peradeniya

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Headache is a neurological disorder affecting a significant portion of the global population and negatively impacts university students' academic performance and quality of life. This research investigated the predisposing, precipitating, and perpetuating factors of headaches among Sinhala-speaking dental students at the University of Peradeniya.

An analytical cross-sectional study was conducted involving 216 Sinhala-speaking dental undergraduates. Participants reported their demographics, headache experiences, physical, lifestyle, and psychological factors associated with headaches using a self-administered online questionnaire created with the "JotForm" platform. A headache index (HI) was calculated by multiplying frequency, average duration, average intensity, recent most intensity and time to last headache episode. Participants were categorized into five headache severity groups (HAgrp) based on 20th percentiles of HI. Validated Sinhala versions of the Pain Catastrophizing Scale (PCS), Depression, Anxiety, and Stress Scale (DASS-21), and Pittsburgh Sleep Quality Index (PSQI) were also administered online. After applying necessary exclusions to maintain validity, data from 164 participants were analyzed with SPSS. Risk factors' association with outcome variables was assessed using Chi-square, Spearman Correlation, and Ordinal Regression.

HAgrp was positively associated with hay fever, gastritis, the presence of headache at menarche, and irregular menstrual cycles. Pain catastrophizing, depression, anxiety, and stress were positively correlated with HI. Sleep disturbances and exposure to hot/cold weather were predisposing to, and sudden stressful situations and educational problems were precipitating headaches among dental students. Academic stress combined with general stress and pain catastrophizing combined with anxiety and stress were found to exert the greatest synergistic (interaction) effects.

These findings contribute to understanding headache aetiology and suggest the importance of addressing psychological and lifestyle factors in managing headaches among dental undergraduate students of the University of Peradeniya.

Keywords: headache index, dental undergraduates, predisposing, precipitating, synergistic effects

Out-of-Pocket Expenditure Incurred by Patients Diagnosed with Oral Potentially Malignant Disorders / Oral Cancer Seeking Care at Dental Teaching Hospital, Peradeniya, Kandy, Sri Lanka

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Oral cancer and Oral Potentially Malignant Disorders (OPMD) impose a significant financial burden on patients, particularly in lower-middle-income countries like Sri Lanka, affecting socio-economically disadvantaged groups. This study aimed to assess the out-of-pocket expenditure (OOPE) and indirect costs incurred by patients with oral cancer and OPMDs seeking care at the Faculty of Dental Sciences (FDS), University of Peradeniya (UOP).

A descriptive cross-sectional study was conducted using an interviewer-administered questionnaire among patients diagnosed with oral cancer and OPMD. Sample size was 114. All available inward patients during the data collection period of 6 weeks were included in the sample. Patients provided information on their out-of-pocket expenses for medical-related as well as non-medical costs related to food and transportation. Loss of wages due to the disease condition was taken as indirect cost. Statistical analysis was performed using SPSS version 22.0.

The results revealed that the median medical-related OOPE for an inward OPMD/ oral cancer patient was LKR 1600.00 (LKR 500.00 – LKR 3000.00) and non-medical-related out-of-pocket expenditure for transportation was LKR 2100.00(LKR 1250.00 – LKR 6450.00), for food was LKR 2900.00(LKR 1,000.00 – LKR 6050.00). The median indirect cost of an inward patient was LKR 3333.33(LKR 2500.00 – 6250.00). Outpatients had incurred less median medical related-OOPE as LKR 362.50(LKR 0.00 - 5000.00). Moreover, their non-medical OOPE for transportation was LKR 1200.00(LKR 600.00 – 3000.00), for food LKR 600.00(LKR 0.00 – LKR 1650.00 only) only. The indirect cost was LKR 3125.00 (LKR 1750.00 – LKR 4875.00).

In conclusion, patients seeking care for OPMD and oral cancer at the Faculty of Dental Sciences experienced high significant out-of-pocket expenditures and indirect costs. The median values of total average OOPE and indirect costs for inward patients were higher than that for outpatients. These findings highlight the need for comprehensive support programs and financial assistance to alleviate the economic strain on patients and their families.

Keywords: Out of pocket expenditure, Oral cancer, Oral potentially malignant disorders, medical-related expenditure, non-medical related expenditure

Herbal Mouthwash Containing Reconstituted Freeze-dried *Mimusops elengi* (Munamal) Bark Extract Against Supra-gingival Plaque Bacteria in Patients with Gingivitis

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According to the available published data on oral diseases in Sri Lanka, the occurrence of periodontal diseases are widespread. Since dental plaque is the main etiological factor for periodontal diseases, plaque control plays a major role in controlling the disease. *M. elengi* is known to have an antimicrobial activity which is used in traditional medicine for a long time. The number of studies available on this specific topic is limited.

The objective of the study was to analyze the antibacterial effect of *M. elengi* bark extract against supra-gingival plaque bacterial growth of patients with gingivitis using well diffusion assay. Thirty four patients with plaque induced generalized gingivitis (BPE codes 1,2) were selected by convenient sampling as the study population. The study compared the efficacy of different concentrations (20000 ppm, 50000 ppm, 100000 ppm) of reconstituted freeze-dried extract of *M. elengi* with 0.2% Chlorohexidine as the positive control in terms of antibacterial activity using well diffusion assay.

The results of the study showed that the sensitivity of supra gingival plaque pathogens to *M. elengi* extract was relatively high across all concentrations tested. The percentage sensitivity increased with increased concentrations of the extract, either as a single isolate or a mixture of two isolates. Further, our study investigated both inter-isolate and intra-patient variation. In inter-isolate variation, the mean diameter of the inhibitory zone increased with higher concentrations of the extract. The median diameter followed a similar pattern. Intra-patient variation, the mean and median diameters of the inhibitory zones showed a similar pattern to the inter-isolate variation. Further, the variance of inhibitory zone areas within each patient was mostly below 1 mm. Thus, our findings suggest a higher consistency of the antibacterial effect of 20000 ppm *M. elengi* against supra gingival plaque bacteria.

In conclusion, the study highlights the effectiveness of reconstituted freeze-dried product of *M. elengi* bark extract in inhibiting the growth of supra gingival plaque pathogens in gingivitis patients.

Keywords: *M. elengi*, supra-gingival plaque bacteria, gingivitis, antimicrobial activity

In vitro Evaluation of the Antibacterial Effects of Some Commercially Available Mouthwashes in Sri Lanka Against *Streptococcus mutans*

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Streptococcus mutans has been proven as the primary causative agent of dental caries. Therefore, inhibition of their growth and biofilm formation is one of the strategies for prevention of dental caries. Mouthwashes are used as an adjunct to mechanical control of oral biofilms and are widely used to maintain oral hygiene. They are popular for their antimicrobial, anti-inflammatory and antioxidant properties. Even though antibacterial activity against *S. mutans* is an important property that can aid in mouthwash selection, information about that property of mouthwashes in Sri Lanka is scarce. Hence, the aim of this study was to evaluate the antibacterial effect of some commonly used, commercially available mouthwashes in Sri Lanka against the major cariogenic bacterium, *S. mutans.*

An experimental laboratory study was conducted using eleven different brands of commonly used, commercially available mouthwashes in Sri Lanka. Three different batches of each mouthwash were tested for their antimicrobial activities against a standard strain of *S. mutans* (ATCC 700610) by disc diffusion assay. The antibacterial effect was analyzed by measuring the diameter of the zone of inhibition.

Six out of the eleven brands of mouthwashes (54%) showed inhibitory zones with a maximum diameter of 23.5 ± 3.6 mm. Intriguingly, two locally manufactured herbal mouthwashes containing clove oil showed the largest zones of inhibition with diameters of 23.5 ± 3.6 mm and 20.7 ± 2.5 mm. Moreover, all three chlorhexidine-containing mouthwashes showed zones of inhibition with a mean diameter of 16 ± 00 mm. The smallest inhibition zone was observed in the mouthwash containing Povidone iodine (8.5 ± 0.6 mm).

More than half of the selected mouthwashes showed antibacterial activity against *S. mutans*. Among herbal mouthwashes, clove oil containing mouthwashes displayed the highest antibacterial activity against *S. mutans,* suggesting that herbal mouthwashes could be an effective natural alternative to chlorhexidine mouthwashes.

Keywords: antibacterial effect, *S. mutans*, mouthwash, zone of inhibition, disc diffusion assay

Impact of Oral Submucous Fibrosis on Psychological Morbidity

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Oral Sub-mucous Fibrosis (OSF) is a well known Oral Potentially Malignant Disorder. Its chronicity, significant debilitations and malignant transformation potential may have an impact on psychological status of the patient. The evidence is very less in the literature to go for psychological interventions in the routine management of OSF patients.

The main objective of this study was to evaluate the relationship between OSF and psychological morbidity in Sri Lankan OSF population. This analytical cross-sectional study included 30 newly diagnosed OSF patients and age, gender-matched controls. Assessment of psychological morbidity of OSF patients was carried out using Depression, Anxiety, Stress scale 21(DASS-21) with 21 questions and Beck's Depression Inventory (BDI) with 21 questions. Assessment of quality of life of OSF patients was carried out with Oral health impact profile-14 (OHIP-14). DASS-21 and BDI were self-administered questionnaires and OHIP-14 was an interviewer administered questionnaire. BDI, DASS-21 and OHIP-14 scores were collected separately for each patient and compared with control group. Analysis of gathered data was carried out by using Minitab v18.0.

BDI, DASS-21 and OHIP-14 values were higher in OSF patients than in the control group, but there is no statistically significant association between OSF and psychological morbidity. There is an association between psychological status of the patients and frequency of betel quid consumption on daily basis. Education and income categories of social status were significantly associated with psychological status of OSF patients. There is no significant association between gender, disease severity, duration of the disease with psychological status and quality of life.

The study shows that there is no significant association between OSF and psychological morbidity measured using BDI, DASS and OHIP-14. There is a need to do an extensive study to identify psychological impact of OSF.

Keywords: OSF, QOL, DASS-21,

Analysis of Antioxidant Levels and *Streptococcus mutans* Inhibitory Activity of *Psidium guajava* Mouthwash

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Psidium guajava has a variety of general medicinal and oral health uses other than the fact of being a popular fruit. Only a few studies have been done on different parts of the *Psidium guajava* for its health benefits, locally and globally. Thus, this study was conducted to evaluate the antioxidant and antibacterial potential and stability of a mixture of the bark, stem, and leaf of the local variety of *Psidium guajava* (Geta Pera).

The mouthwash was prepared by boiling a mixture of leaf, bark, and stem of *Psidium guajava* in water using a standard decoction method and stored at 4 ^{0}C. DPPH and ABTS assays were carried out to determine the antioxidant potential of the prepared mouthwash. DPPH assay was repeated in 2-weeks intervals to assess the stability of the mouthwash. Antibacterial effects and acid production inhibition were tested against a standard strain of *S. mutans* (ATCC 700610).

According to the results of the DPPH assay, the antioxidant activity of the *P. guajava* mouthwash expressed as the IC50 was 0.44 ±0.005 µL/ml. After a period of one month at 4 ^{0}C, it was 0.43±0.004 µL/ml. After two months, it was 0.43±0.001 µL/ml. According to the results of the ABTS assay, the mean value of TEAC of the mouthwash was 0.22±0.015 mg/ml. Although, the disc diffusion assay did not show a significant inhibition of *S. mutans, P. guajava* mouthwash showed a significant inhibition of acid production when compared to the negative control.

The *P. guajava* mouthwash has antioxidant activity which was stable for a period of 2 months at 4 ^{0}C. It can also inhibit the acid production by *S. mutans.* Since *P. guajava* is a readily available plant in Sri Lankan home gardens, the *P. guajava* mouthwash can be further improved and used as a low-cost oral healthcare product to improve the oral hygiene of Sri Lankans.

Keywords: *Psidium guajava*, DPPH assay, ABTS assay, TEAC, IC 50

Association between Economic Crisis and Changes in Behavioural Risk Factors of Oral Cancer in Three-Wheeler Drivers in Kandy district

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Oral cancer is a national oral health problem showing a higher prevalence out of all cancers in Sri Lanka. The main behavioural risk factors of oral cancer are betel quid chewing, smoking and alcohol consumption. Three-wheeler drivers have been identified as one of the risk groups of oral cancer.

This study was conducted to determine the association between the Sri Lankan economic crisis and changes in behavioural risk factors of oral cancer in three-wheeler drivers of the Kandy district in Sri Lanka. Changes in income and expenditure, changes in the number and frequency of risk habits and cessation of habits were assessed. A cross sectional study was conducted among 384 three-wheeler drivers. Data was collected using an interviewer-based questionnaire and statistical analysis was done using SPSS version 23.

All the participants were males. The mean age of the participants was 44 years (SD=11.79). Monthly income had decreased for most participants whereas monthly expenditure had increased for everyone. The amount of betel chewing and smoking of full cigarettes showed a significant decrease from 2021 to 2022 (p<0.001). However, Arrack and Beer consumption showed a significant increase in frequency from 2021 to 2022 (p<0.001). Smokers had changed their habit due to the economic crisis, and a similar response was reported among alcohol consumers. Out of all participants, 0.5%, 0.2% and 0.7% started betel chewing, arrack consumption and smoking respectively after the economic crisis.

The economic crisis had an impact on change in smoking and alcohol consumption but not on betel quid chewing. Furthermore, a price increment policy on full cigarettes and alcohol may have a positive public health impact in the country.

Keywords: economic crisis, behavioural risk factors, oral cancer, three-wheeler drivers

Survey on Correlation Between Histological Parameters and Prognosis of Oral Squamous Cell Carcinoma (OSCC) in Patients Who were Less Than 45 Years of Age

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Oral cancer is a key contributor to the global burden of cancer. The incidence of oral cancer in younger patients is on the rise in Sri Lanka and the Asian region.

This study is to identify a correlation between histological parameters and prognosis of OSCC in patients who were less than 45 years of age that had been diagnosed histologically at the Department of Oral Pathology, Faculty of Dental Sciences, University of Peradeniya through a retrospective prospective analysis for a period of 10 years (2010-2019).

Demographic and histopathological details such as tumour differentiation, pattern of invasion (POI), excision margins, host response, tumour metastasis, nodal involvement, perineural and vascular invasion and details such as clinical sites of lesion and habits history, 3-year and 5-year survival details, recurrences have been considered in the study. Descriptive statistical analysis and Pearson's Chi-square test analysis were done.

The final sample size was 23. There were 18 males (78.3%) and 5 females, (21.7 %) with a M: F ratio of 3.6: 1. The commonest site of cancer was buccal mucosa followed by the tongue. The POI type II showed a relatively higher 3 and 5 years survival rate compared to the types III and IV. A higher survival rate was observed with well-differentiated tumours. Further, higher survival rates were observed in patients with dense host response, tumours with less than 5mm depth of invasion and those who had completely excised tumour margins. There was a statistically significant correlation between lymph node metastasis and patient survival ($p<0.05$).

Further research with larger sample sizes and data from multiple centres are necessary to make definitive conclusions. The patients with OSCC should be continuously followed up to identify how survival details vary with histopathological variables. The findings of this research emphasize the importance of early diagnosis of OSCC.

Keywords: oral squamous cell carcinoma, prognosis, survival, histopathological prognostic parameters

In-vitro Analysis of the Anti-Candida Activity of *Senna alata* (Aththora)

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Oral candidosis is the most common fungal infection of the oral cavity, caused by Candida spp approximately 5–7% of infants develop oral candidosis. Its prevalence in AIDS patients is estimated to be 9–31% and close to 20% in cancer patients. Topical and systemic antifungal agents are used to effectively treat candidosis. But finding alternatives is important as some of these drugs show resistance and several side effects. Therefore, finding new therapeutic agent is important. *Senna alata*, commonly known as "Aththora" is used in indigenous medicine for fungal infections. It is expected that *Senna alata* may have anti candida effects.

Objectives of this study were to investigate the anti-Candida activity of hexane, ethyl acetate (ETA) and methanol leaf extracts of Senna alata and to determine minimum inhibitory concentration (MIC) of the respective extracts against standard Candida isolates namely, *Candida albicans, Candida glabrata, Candida tropicalis, Candida parapsilosis and* Candida krusei.

Identity confirmed *Senna alata* was used to obtain the extracts. Growth inhibitory effect of prepared leaf extracts on above mentioned standard Candida isolates were observed by agar well diffusion technique and measured the inhibitory zones. MIC of the ETA extract was determined using the agar dilution plate method. The results obtained were recorded in an EXCEL sheet and analyzed using MiniTab and SPSS (version 25). Descriptive statistical methods, one way ANOVA, two way ANOVA and Tukey's test was used for data analysis.

Only ETA extract had an inhibitory effect on *C. albicans, C. glabrata, C. tropicalis* and *C. krusei*. Mean zone of inhibition of ETA extract for *C. tropicalis*, *C. glabrata*, *C. albicans, C. krusei* were 5.67 (3.06), 4.33 (2.08), 3.33 (0.58) and 2.00 (0.00) in mm. There was no statistically significant difference in the effect of ETA extract against Candida spp (p=0.264). Assessment of MIC using ETA on *C. albicans, C. tropicalis* and *C. glabrata* revealed that the MIC lies between 25 mg/ml-20 mg/ml.

ETA extract of *Senna alata* has anti-Candida effect on *Candida albicans*, *Candida glabrata* and *Candida tropicalis* and may be a promising anti-Candida therapeutic agent with less activity than nystatin. Further studies are necessary to confirm this effect.

Keywords: anti-candida activity, *Senna alata,* candidosis

Post Operative Wound Infections in Oral Cancer Patients Following Primary Surgery with Neck Dissection at the Dental (Teaching) Hospital, Peradeniya - A Retrospective Study

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Oral cancer is a leading malignancy among Sri Lankans. The treatment of choice for oral cancer is surgery with neck dissection. Post Operative infection (POI) is a common complication associated with oral cancer surgery that accounts for poor quality of life.

This study aimed to assess the incidence, pathogens, and associated factors of POI in oral cancer patients after primary surgery with neck dissection at the Dental teaching hospital Peradeniya, Sri Lanka during the period from June 2020 to May 2022.

Data regarding demographics, type of surgery, pathogens, and associated factors for POI were collected retrospectively from the bed head tickets of the patients who had primary surgery with neck dissection for oral cancer during a two-year period (June 2020 to May 2022). The collected data were entered in Microsoft 365 Excel and analyzed using IBM SPSS 25.0 software. Demographic data were analyzed using descriptive statistics and the associations were explored using chi-square test.

A total of 95 patients had undergone primary surgery with neck dissection. Their age ranged from 27 to 83 years with a mean age of 62.6±10.82 years. There were 32 patients (33.68%) with POI. POI was common among females. Common pathogens associated with POI were coliforms and *Pseudomonas* species. Patients who belonged to Tamil ethnicity (p=0.001) with a Bilateral/Modified/Radical Neck Dissection (p=0.012), and PMMC reconstruction (p=0.001) were more prone to have POI. Further, patients with B positive blood group (p=0.003) and those with an intra-operative blood loss of more than 1000 ml (p=0.015) showed a statistically significant association with POI.

In conclusion, the POI incidence was 33.68% for the current sample. Main causative organisms were coliforms and *Pseudomonas* species and the commonest antibiotic used to manage POI was gentamicin. Tamil ethnicity, Bilateral/Modified/Radical neck dissection, PMMC reconstruction, B positive blood group and a blood loss of more than 1000 ml were significantly associated with POI in the current sample. Consideration of these associated factors would be beneficial to avoid POI in the current clinical setting.

Keywords: oral cancer, neck dissection, post operative infection

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