RESEARCH
MANAGEMENT CENTRE
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA
KUANTAN CAMPUS

TTO
TECHNOLOGY TRANSFER OFFICE

IRID 2024

الجامعة الاسلامية العالمية ماليزيا
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA
Garden of Knowledge and Virtue

LEADING THE WAY
KHALIFAH · AMĀNAH · IQRA' · RAHMATAN LIL-ĀLAMĪN
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INTERNATIONAL MULTI-AWARD WINNING INSTITUTION FOR SUSTAINABILITY

IIUM RESEARCH & INNOVATION DAY 2024

LEADING THE RESEARCH, PUBLICATION AND INNOVATION CULTURE: SOARING HIGH IN RESEARCH EXCELLENCE

TUESDAY | 2ND JULY 2024 | 25 ZULHIJJAH 1445 H

GRAND HALL, OFFICE OF CAMPUS DIRECTOR, INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA, KUANTAN

FOR FURTHER INFORMATION:
HTTPS://CONFERENCE.IIUM.EDU.MY/IRID/ @

SCAN ME

ORGANISER:
RESEARCH MANAGEMENT CENTRE, IIUM

The IIUM Research and Innovation Day (IRID) 2024 is a prominent exhibition dedicated to health and sciences research, organized to showcase innovative research findings and foster research collaboration among scholars from the International Islamic University Malaysia (IIUM) and across Malaysia. This year's theme, **"LEADING THE RESEARCH, PUBLICATION AND INNOVATION CULTURE: SOARING HIGH IN RESEARCH EXCELLENCE,"** emphasizes the significance of publishing research outcomes to spread knowledge for humanity's benefit. The event is a joint effort with the Technology Transfer Office of the Research Management Centre, highlighting the potential for research projects to be selected for commercialization.

It offers a platform for interactive poster presentations, discussions, and the exhibition of creative innovations. The program aims to provide constructive feedback, facilitate the sharing of ideas, and encourage networking among researchers. **All submitted abstracts will be published in selected IIUM journals (MYCITE – indexed)** with awards for the best research and innovation in both student and staff categories. Participants are also encouraged to publish full articles in various IIUM journals. This initiative seeks to benefit attendees greatly, promoting experience sharing and the development of lasting relationships within the research community.

The objectives of the IRID 2024 are as follows:

- To identify the prominent researchers in Malaysia mainly IIUM Kuantan.

- To inculcate research culture among academic staff and students (postgraduate and undergraduate).

- To showcase the research findings and products of academic staff and students.

- To encourage inter Kulliyyah/ Universities/ Institutions collaboration in research and innovation.

- To identify the best research outputs and products to represent IIUM at national and international competition.

The topics are

1. Basic Health Sciences

2. Applied Health Sciences

3. Medical & Health Sciences

4. Nursing & Midwifery

5. Pharmacy

6. Dentistry

7. Engineering

8. Biological Sciences

9. Art & Social Sciences

Chairman
Prof. Dr. Nazri Mohd. Yusof

Bismillahirrahmanirrahim.

Assalamualaikum warahmatullah wabarakatuh.

Alhamdulillah, it gives me great pleasure to welcome you to IIUM Research and Innovation Day IRID 2024: An Exhibition for Health and Sciences Research. This programme aims to showcase innovative research findings and encourage research collaboration among researchers from IIUM and also around Malaysia.

The theme for this year's event is LEADING THE RESEARCH, PUBLICATION AND INNOVATION CULTURE: SOARING HIGH IN RESEARCH EXCELLENCE.

We want to highlight again the importance of publishing research results as a way to disseminate knowledge for the benefit of mankind.

This year's program is a collaboration with the Technology Transfer Office of the Research Management Centre. Your research has the potential to be selected as a potential research product for commercialisation.

The poster presentation will allow interaction and discussion among researchers. We also invite researchers who have creative innovations to showcase their products at this event.

I hope this event will serve as a good platform for you to receive constructive feedback, share ideas and spark friendships with other researchers.

All submitted abstracts will be published in selected IIUM journals (MYCITE – indexed), and awards will be given for best research and innovation among the students and staff categories. Participants are also invited to publish their research as full articles in IIUM journals.

I hope everyone benefits greatly from this event; I am looking forward to knowing you, sharing our experiences and building a lasting relationship together.

Thank you.

IIUM Research and Innovation Day (IRID) 2024
2nd July 2024 (Tuesday)
Grand Hall, Office of the Campus Director
International Islamic University Malaysia (Kuantan Campus)

Program Schedule

Time	Event
8.30 am	Registration of participants
8.45 am	Arrival of VIP and Guests
9.00 am	Negaraku, Pahang Song, IIUM Song
9.05 am	Recitation of Dua
9.10 am	Opening remarks **Prof. Dr. Nazri Mohd. Yusof** Chairman IIUM Research and Innovation Day 2024
9.15 am	Officiating Speech & Officiating Ceremony Gimmick **YB Dato' Mohamad Nizar Bin Dato' Sri Mohamad Najib, DSAP** Pahang State Executive Councillor (EXCO) Investment, Industrial Development, Science, Technology and Innovation
9.25 am	Token of appreciation for external guest
9.35 am	Video Presentation Group photo
9.40am	VIP visit the poster exhibitions and showcase
10.00 am	Refreshments for VIPs and Invited guests
10.30 am	Commercialization Talk 1 **Prof. Dr. Mohd Shahir Shamsir Omar** (Universiti Teknologi Malaysia, UTM) Title: "From Discovery to Disruption: Transforming Research into Start-up Success"
11.15 am	Poster evaluations
1.15 pm	Lunch break
2.00 pm	Poster evaluations continues
3.00 pm	Commercialization Talk 2 **Madam Mariatini Othman** (Senior Vice President, Technology Advisory Services, MTDC) Title: "Unlocking Opportunities: The Dynamics of Commercialization Ecosystems"
3.00 pm	Scientific Research Meeting
4.00 pm	Announcement of Winners for best participants
4.15 pm	Prize giving ceremony and closing remarks **Prof. Dr. Nazri Mohd. Yusof** Chairman IIUM Research and Innovation Day 2024
5.00 pm	End of program and adjourn

Concurrent Events (10.00 am – 4.00 pm) @ Grand Hall, IIUM Kuantan

One Stop Research Clinics by IIUM Gombak
1. **Grant Initiative Unit (GIU)**
2. **Grant Management Unit (GMU)**
3. **Research Excellent Unit (REU)**
4. **Technology Transfer Office (TTO)**
5. **Copyright and MyRA Publication (Dar Al-Hikmah Library)**

As of 24/6/2024

Islamic Ethics in Machine Learning: Bridging the Gap Between Tradition and Technology

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PURPOSE: The study aims at bridging the existing gap between rapid technological advancements and principles of Islamic morality.

METHODS: In the study, the foundational pillars of Islamic ethics—Tauhid (the oneness of God), Khalifah (stewardship), Adl (justice), and Maslahah (public interest)—and their relevance in contemporary fields such as healthcare, education, finance, and transportation is explored. Furthermore, the paper scrutinizes the fundamental ethical considerations in ML. These include fairness, accountability, transparency, and explainability and other impacts to society such as bias, discrimination, and current global concerns on privacy, security, and cultural sensitivity. This study is expected to highlight the congruence relationship between Islamic ethical principles and the ethical demands of modern technology. As Islam inherently supports technologies that positively contribute to humanity, this research asserts that there is a need to align them to Islamic values. The study presents detailed strategies for integrating Islamic ethics into ML using means such as illustrative case studies in different industries - e-commerce, e-learning, e-health, and different Islamic digital platforms.

RESULTS: The discourse extends to the challenges and opportunities presented by this integration by emphasizing the need to embed Islamic values and methodologies within the ML algorithms. In addition, the importance of interdisciplinary collaboration among technologists, ethicists, and Islamic scholars is also highlighted. This will ensure that the development of Shariah-compliant ML and Artificial Intelligence (AI) systems could be initiated and later available to the public. This paper also addresses the complexities of amalgamating Islamic ethics with ML due to the diverse range of ethical standards and norms. Identification of commonalities and disparities between them is also an important consideration. Moreover, the study also advocates for dialogue and cooperation across various ethical traditions in ML and AI to establish common ground. This is required since it acknowledges the global reach of these technologies that transcend international borders and cultural contexts. The study also envisioned future research directions focusing on fostering research, development, and innovation among Muslim practitioners and stakeholders. It is seen from the study that collaboration, communication, and coordination to establish a unified source of AI and ML ethics is important.

CONCLUSION: In conclusion, this paper significantly contributes to the field of ML and Islamic ethics. By promoting a diverse and pluralistic approach to ethical considerations in ML, the study addresses the critical question of how Islamic ethical principles can be seamlessly integrated into the fabric of machine learning and artificial intelligence. In the end it is expected that knowledge and practice in the domain could be advanced and a harmonious convergence of technology and Islamic ethical values is fostered.

Keyword: Islamic Ethics in Technology; Shariah-Compliant AI Development; Ethical AI in Islamic Context; Integration of Ethics and ML

Speakable Me: The Development of Speech Assistance Tools for Patient with Speech Disabilities

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PURPOSE: The study aims to develop an affordable and user-friendly mobile application, "Speakable Me," to assist patients with speech disabilities, such as Aphasia and Dysarthria, in communicating effectively. The application is designed to bridge the gap left by existing Augmentative and Alternative Communication (AAC) technologies, which are often costly and limited in functionality.

METHODS: The research involved a comprehensive analysis of existing AAC technologies and the specific communication needs of patients with speech disabilities. The "Speakable Me" system was developed using React Native, Visual Studio Code, and Firebase. The development approach that is used in developing Speakable Me is the Waterfall Development Model. The Waterfall model is a model with a linear and sequential approach which the team needs to follow step-by-step without moving forward until the previous phase has been completed. The application offers three categories of speech assistance, each tailored to different levels of user ability: full spelling input, Morse code, and pictograms. It also includes customizable libraries where users can add their own words and voices.

RESULTS: The development of "Speakable Me" resulted in a versatile and accessible speech assistance tool that caters to varying levels of speech disability. The application was successfully tested to provide higher words per minute (WPM) communication rates for patients, with minimal physical effort and at a lower cost compared to existing AAC technologies.

CONCLUSION: "Speakable Me" addresses the critical need for an affordable, user-friendly AAC tool, particularly for low-income users. The application enhances the quality of life for individuals with speech disabilities by enabling clearer and faster communication with caregivers and loved ones. Future work will focus on expanding the application's features and further improving its usability and accessibility.

Soliton Propagation in A One-Dimensional Discrete System Within Self-Action Mode

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PURPOSE: Accordingly, this study delves into the propagation dynamics of discrete solitons using both analytical and numerical computations, seeking to achieve a comprehensive understanding of their dynamical behaviour.

METHODS: Through the analytical approach, i.e., the variation approximation (VA) method, essential parameters governing soliton evolutions, such as the width, center-of-mass position, and linear and quadratic phase-front corrections are determined and graphically interpreted. These results are compared against direct numerical simulations of the main equation for validation.

RESULTS: It is observed that an increase in linear phase-front correction corresponds to an increase in both the soliton's initial velocity and propagation distance throughout the process. Additionally, direct numerical simulation reveals the increasing prominence of the discreteness effects with higher initial velocities.

CONCLUSION: The findings underscore the applicability of the VA method in analyzing the soliton propagation phenomena within the DNLSE's self-action mode, laying the groundwork for advancements in the manipulation and control of soliton dynamics across various practical applications.

Keywords: Discrete soliton, nonlinear Schrödinger equation, discrete system, nonlinear partial differential equation, variational approximation method, nonlinear waves

Sexual Dimorphism in Brain Volume: A Comparative Analysis Using Voxel- Based Techniques and Neuroimaging Templates

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PURPOSE: This study aims to evaluate the structural differences between male and female brains of young adults using voxel-of-interest analysis techniques.

METHODS: Utilized retrospective data from 47 participants (19 males, 28 females) aged 20 to 25 years (mean ± SD age, 22.55 ± 1.472 years) who underwent T1-weighted MRI brain scans. Brain images were processed using a customized MATLAB script and established methods via Statistical Parametric Mapping (SPM) with the Computational Anatomy Toolbox (CAT12). We applied voxel-of-interest analysis techniques with widely recognized brain templates including Automated Anatomical Labeling (AAL), Neuromorphometrics (Neuromorphic), Labeled Brain Atlases (LPBA40), Spatially Unbiased Infratentorial Template (SUIT), Wake Forest University PickAtlas (WFU PickAtlas), and Computational Brain Anatomy (CoBrA).

RESULTS: Findings demonstrate that our customized MATLAB script generates results consistent with those obtained using the established method, showing larger brain volumes in males compared to females, both globally and regionally. Voxel-of-interest analysis highlights significant gender differences in major brain areas associated with sexual dimorphism in the temporal pole and gyrus, cerebellum, amygdala, hippocampus, putamen, and cingulate gyrus with some sensitivity to the analytical methods employed.

CONCLUSION: Our investigation comparing voxel-of-interest techniques underscores the importance of methodological considerations in studying brain sexual dimorphism. In Islamic teachings, the Quran acknowledges the inherent differences between males and females, stating in Verse 36 of Chapter 3: "And the male is not like the female." This verse reflects the recognition of distinct attributes and roles assigned to men and women, resonating with the scientific exploration of structural brain differences between genders.

Keywords: Brain, Sex differences, MRI, Volume

Poisson Quadratic Stochastic Operator Generated by Singleton of 2-Partition

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PURPOSE: In this research, we introduce a new class of Poisson QSO, specifically generated by a 2-partition of a singleton. This innovative approach involves constructing such an operator within the set of all integer state spaces. Once the operator is constructed, we will examine its trajectory behavior, focusing on the dynamics of a singleton {0}, as one of the measurable 2-partition.

METHODS: Firstly, we construct a class of Poisson QSO generated by a singleton of 2-Partitions on the set of all integers. We simplify the constructed dynamical systems into a one- dimensional setting. Then, we determine its regularity using an analytical method based on Lyubich's Theorem. Finally, we present a graphical representation of this regularity to support the proof.

RESULTS: The nature of this operator can vary significantly based on its parameters, leading to two distinct types of transformations which are regular where there exist fixed points or nonregular if there is a presence of periodic points of period 2.

CONCLUSION: These results indicate that the Poisson QSO generated by a singleton of measurable 2- partition exhibits either regular or nonregular transformation behavior, depending on the specific parameters chosen. This distinction is crucial as it highlights the versatility and complexity of QSOs in describing dynamical systems across various fields, including population genetics and beyond.

Keywords: Quadratic Stochastic Operator, Poisson distribution, regular transformation

Electrosprayed Hybrid Gold Nanoparticles Size for Drug Delivery Based On Formulation Density And Gauge Size

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PURPOSE: The objective of this research is to investigate the effects of experimental parameters of different gauge sizes and formulation densities on the electrospray particle size.

METHODS: This study evaluated different gauge sizes (23G and 25G) and poly lactic-co-glycolic acid-polyethene glycol (PLGA-PEG) with gold nanoparticles (AuNPs) formulation densities ranging from 22 mg ml^{-1} to 40 mg ml^{-1} to obtain the desired uniform hybrid nanosized particle for drug delivery usage. Briefly, PLGA-PEG was dissolved in acetone, then AuNPs and drug solutions were added and stirred before synthesizing the electrosprayed hybrid nanoparticles. Electrospray hybrid nanoparticles size and polydispersity index (PDI) were measured and found that 25G needle produced smaller particles (141.4±17 nm) with a 51 % reduction compared to 23G needle, which produced larger particles (159.3±17 nm) with a similar PDI value (0.34-0.36). The smaller nozzle diameter in the 25G needle facilitated smaller particle formation in the conical meniscus mode (Taylor cone). Additionally, a linear trend was observed between formulation density and particle size, with higher densities requiring increased voltage to overcome the surface tension of the droplet, causing larger nanoparticles.

RESULTS: These results were expected due to the concentration gradient and solvent evaporations in which competing surface recession and solute diffusion rates.

CONCLUSION: In conclusion, Taylor cone and evaporation rates affect the particle size related to the gauge size and formulation density.

Keywords: Hybrid nanoparticles, electrospray, Taylor cone, evaporation rates, surface tension

Psychological, Social, And Cultural Meaning of Substance Abuse Among Adolescents In Lagos State, Nigeria

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PURPOSE: The aims of this study is to list the common substances that adolescents abuse and to discover the motives behind the abuse of substances among adolescents.

METHODS: This qualitative study employed a purposive sampling method using the snowball technique. Data was collected using semi structured interview that triangulates with focused group discussion and field observation. 17 students were interviewed, and 20 students were present for the focused group discussion.

RESULTS: The outcome of these research revealed that the most abused substance among the adolescents is palm wine (n = 15), followed by alcohol (n = 12), red wine, 13 respondents. Beer had 3 respondents and cigarette, marijuana, tramadol had 2 each. Thematic analysis revealed main themes such as hedonic pursuits, eudemonic efforts and ecosystem. Hedonic pursuits consist of subthemes such as excitation and adventure. Eudemonic efforts consist of subthemes such as functional emotional and social motives. Finally, ecosystem has subthemes such as accessibility, poverty, tradition and parental influence

CONCLUSION: The rate of substance abuse among Nigerian adolescents is very high and it requires a lot of attention and most importantly, swift intervention by the government, schools and individual family. Government and educational institutions should engage with psychologist and therapist to improve awareness of parents on substance abuse and design exciting and adventurous intervention programs that are consistent with their motives for substance abuse.

Keywords: Adolescent, Nigeria, Psychological, Substance abuse

Relation of Energy Level of Z5-Symmetric Model on Square Lattice with Zeros Distribution in Argand Plane

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PURPOSE: This study aims to lay the groundwork for arbitrary cases based on the observation of the zeros of partition functions for some selected energy levels. The objectives of this study are to calculate the partition function for Z5-symmetric models on increasing square lattice and plot the zeros of the partition functions on the complex Argand plane. A comparison between energy levels will be made from this study.

METHODS: We use the transfer matrix method to expedite the computation of the partition functions. The open horizontal boundary condition and periodic vertical boundary condition are chosen for some symmetry of the transfer matrix. The zeros of the partition functions are calculated using the Newton-Raphson method. Energy levels are selected based on some small energy steps as the fundamental work.

RESULTS: Observations from the plot of zeros of partition functions suggest some relation across models based on their energy step. The plots also hint the existence of phase transition for each model.

CONCLUSION: The relations of the models can lay the groundwork for arbitrary cases. In addition, the partition functions and their zeros can be further analyses to strengthen these relations and to study the criticality of each model.

Keywords: equilibrium statistical mechanics, Potts model, ZQ-symmetric model, square lattice,

The Effect of The Holy Quran Recitation and Listening on Anxiety, Stress, And Depression: A Scoping Review On Outcomes.

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PURPOSE: This study aims to investigate the effects of the Holy Quran on anxiety, stress, and depression.

METHOD: A systematic search was conducted in PubMed, Web of Science, and Scopus databases to identify relevant studies. Three researchers screened articles and selected them based on inclusion and exclusion criteria. Data was analyzed using a standardized form, with disagreements resolved through consultation. The scoping review adhered to the PRISMA checklist.

RESULTS: A total of 174 articles were retrieved and 15 met the inclusion criteria. All studies were conducted in Asian countries. The majority investigated the effects of Holy Quran recitation and listening on anxiety (45%), followed by stress (30%) and depression (25%). The Beck Depression Inventory was commonly used to assess outcomes. The primary findings indicated a reduction in anxiety, stress, and depression levels following Quranic intervention. Moreover, the practice was noted for its simplicity, affordability, and practicality, serving as a cost- effective treatment option.

CONCLUSION: The study concludes that Quranic recitation and listening signify valuable nonpharmacological interventions for anxiety, stress, and depression. These findings emphasize the potential of Quranic practices as accessible and effective methods for improving mental health.

Keywords: Holy Quran, recitation, listening, anxiety, mental health, nonpharmacological treatment

Load Factor Integration in 2-Opt and 3-Opt Local Search Heuristics for Optimization of Green Vehicle Routing Problem

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PURPOSE: This study aims to integrate the load factor in 2-Opt and 3-Opt search procedures with consideration of both distance and load dependent costs in green vehicle routing problem for heavy duty vehicle. Following that, this study provides a performance analysis for both local search operators.

METHODS: The load factor is integrated in the search procedure using the Comprehensive Modal Emission Model (CMEM). The weighted sum method is used to reformulate the two objective functions into one aggregated cost. Hypervolume indicator and deviation test is conducted for performance analysis.

RESULTS: The computational test results indicate positive enhancement in the integration of the load factor when comparing load based and regular local search methods. By analyzing the performance of the operators, 3-Opt performs slightly better than 2-Opt, however it requires higher computational effort.

CONCLUSION: In conclusion, integration of load factor is important to generate more sustainable route alternatives in vehicle routing.

Keywords: Green vehicle routing problem, 2-opt, 3-Opt, load factor.

Development of Alginate Microcapsules Encapsulating Formalin-Killed Streptococcus agalactiae For Oral Vaccination of Nile Tilapia: A Comprehensive Study Using Molecular and Immunological Approaches

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Nile tilapia is one of the major farmed fish that suffers from being infected with Streptococcus. In general, oral vaccination is the easiest method, however, the antigen is normally degraded by the gastric juices. Hence, encapsulation in alginate could protect the antigen from the gastric juices leading to higher immunogenicity of the antigens such as formalin-killed cells. In this study, formalin-killed cells of Streptococcus agalactiae (FKC) encapsulated in alginate were used to vaccinate Nile tilapia. Microcapsules of 500±20 µm diameter were fabricated with an encapsulation efficiency of 86%. The fish were divided into four groups and given experimental diets for 14 days, fish in group A were vaccinated by alginate microcapsules encapsulating FKC, the fish in group B were vaccinated by FKC, the fish in group C were fed empty alginate microcapsules, and the fish in group D were fed commercial pellets. Afterward, on the 7, 14, 21, and 28th day post-vaccination, blood samples were collected. Group A demonstrated the highest bactericidal activity, lysozyme activity, and serum antibody titer (p<0.001). At 29 days post-vaccination, an expression analysis of immune-related genes was performed, the results revealed significant upregulation of all tested genes in group A (p<0.001). Lastly, on day 30 post-vaccination, a challenge test was conducted by injecting virulent S. agalactiae, as a result, the relative survival rates were 92± 2%, 48± 5% and 4± 3% for groups A, B and C respectively. The alginate encapsulated group A was also significantly (p<0.01) higher than naked vaccine (Group B), which showed that alginate provided protection to the FKC from gastric juices. The results of this study indicated that the FKC-alginate microcapsules were highly immunogenic and could be administered orally to Nile tilapia to prevent infection with S. agalactiae.

Keywords: Nile Tilapia, Streptococcus agalactiae, alginate, microcapsules, vaccine, immunity.

Balok River Tachypleus Gigas Proximate Analysis

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PURPOSE: This study analyses the proximate composition of horseshoe crab from Kuantan Balok River specifically Tachypleus Gigas species. The objective is to present the proximate composition of Tachypleus Gigas for public awareness.

METHODS: The experiment adapted several methods, firstly for moisture is AOAC 931.04, ash is AOAC 923.03, crude protein is AOAC 920.39, fat is AOAC 945.18A, lastly total carbohydrate and energy both refer to AOAC Method of Analysis for Nutritional Labelling (1993: 8,5). The experiment is repeated three times for consistency.

RESULTS: Results of proximate analysis revealed high energy content at 208.67kcal/100g±0.58 (egg) and 78kcal/100g±0 (meat). Second is crude protein is 29.43g/100g±0.21 (egg) and 17.70g/100g±0.1 (meat). Next is moisture 55.87g/100g±0.06 (egg) and 79.20g/100g±0 (meat). For ash content is 1.6g/100g±0.1 (egg) and 1.57g/100g±0.06 (meat). The total fat on average is 7.67g/100g±0.15 (egg) and 0.23g/100g±0.06 (meat). The average total carbohydrate calculated is 5.43g/100g±0.49 (egg) and 1.3g/100g±0 (meat). The data reveals the energy content (calories), is significantly larger for both meat and eggs in relation to the other criteria where 100g egg is at 208.67 kcal. For comparison a large chicken egg will typically have 80 calories. Horseshoe crab eggs have more calories per tablespoon than chicken eggs do. According to Malaysian Ministry of Health the recommended caloric intake is 2,000 calories for males and since an adult female crab can contain up to 1kg of egg, or 2008 kcal in raw form, the amount of calorie can be a detrimental to some for example an obese person but can also be a boon to others for example for muscle building to a bodybuilder.

CONCLUSION: A single meal might easily surpass the daily recommended calorie intake so awareness on the proximate composition is important before consumption.

Keywords: Horseshoe Crab, Tachypleus Gigas, Proximate Analysis, Balok River.

An Investigation of Lightning-Induced Voltage on The Overhead Distribution Line in Sabah

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PURPOSE: To evaluate the configuration parameters of the lightning current, to analyze the impacts of lightning electromagnetic field (LEMF) and LIV on the overhead distribution line.

METHODS: The research refers to IEEE 1410-2010 as a guideline and utilizes MATLAB software to generate the results of the lightning current, electromagnetic field, and induced voltage. It employs the Heidler model to simulate lightning current, the dipole and Finite-Difference Time-Domain method for LEMF calculations.

RESULTS: The results of the study reveal that in Sabah, the impact of the lightning current is much higher at least by 10% compared to peninsular Malaysia. This result will consequences lead to the increase of LEMF. The LEMF at particularly of clay soil resistivity is increased by 10%. Thus, LEMF peak is notably higher, with an increase of at least 5% to 10% compared to Peninsular Malaysia, dependable on soil resistivity.

CONCLUSION: This finding underscores the heightened risk of lightning-induced overvoltages in Sabah, necessitating additional precautions to mitigate this increased risk effectively. It promotes sustainable development goals (SDG) 3 which healthy living and well-being of consumers from the zero fatalities occurs in electrical system.

Keywords: Lightning Induced voltage, Return stroke Current, Lightning Electromagnetic field, Channel base Current

MentAllay; A Mobile Application for Mental Health

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PURPOSE: Starting with the COVID-19 pandemic in Malaysia, adults in poor general health encompassing both physical and mental health reported significantly higher rates of depression compared to those in good health. Alarmingly, suicidal ideation cases surged to 468 within the first five months of 2021, nearly matching the total annual figures for 2020 and 2019. In response, we developed MentAllay, a mobile application designed to provide a secure community where individuals can share their feelings and thoughts, offering mutual support.

METHODS: The development of MentAllay was informed by comprehensive research, including interviews, surveys, and an extensive review of relevant literature.

RESULTS: The project involves the development of a mobile application focused on user interface (UI) and user experience (UX) design, addressing specific user needs through robust integration and functionality. The UI prototypes were created using Adobe XD, ensuring a visually appealing and user-friendly design. For the front-end development, React Native was chosen due to its cross-platform capabilities and efficiency. The back end was built using Node.js, providing a scalable and reliable server-side environment. Firebase played a crucial role in managing authentication, database operations, and storage, streamlining the development process and ensuring data security and integrity.

CONCLUSION: Overall, the project successfully delivered a robust and user-friendly mobile application, meeting the initial UX requirements and demonstrating the effectiveness of the chosen development tools and methodologies. The positive reception from User Acceptance Test (UAT) participants highlights the application's potential for widespread adoption and future growth. By continually improving the application's features and security measures, we aim to provide a safe, supportive, and enriching environment for all users.

Keywords: Mobile Application Development, Mental Health Application, Islamic Mediation

Feasibility Study of Renewable Energy Installation in Hospital: A Case Study of Kota Tinggi, Johor, Malaysia

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PURPOSE: This research aims to investigate the feasibility of implementing renewable energy systems in a hospital located in Kota Tinggi, Johor which consists of solar energy and rainwater harvesting. To carry out the research, a few targeted objectives have been set. Firstly, to identify the renewable energy system requirements for various hospital facilities and secondly, to propose the technical aspects of implementing the system in the hospital.

METHODS: The data collected showed that the local solar radiation is 1707.9 kWh/m^2 annually, while the annual rainfall is 2628 mm. PVsyst software was used to design the solar PV system and calculate the expected energy output. Meanwhile, Tangki NAHRIM software was used to design and simulate the rainwater harvesting system.

RESULTS: Results indicate that installing 1467 units of 460W solar panels generates 961,508 kWh annually, reducing the hospital's energy consumption by 20% and leveraging the area's solar radiation for optimal efficiency. The implementation of a rainwater harvesting system involves two 15,000-liter tanks designed to collect and store rainwater. This system addresses an annual water demand of 438,000 liters, effectively covering gardening and irrigation over an area of 2,000m^2.

CONCLUSION: The implementation of both renewable energy systems at the hospital demonstrates the feasibility and effectiveness of integrating renewable energy solutions in healthcare facilities. It reduces energy consumption while maintaining a sustainable water supply for gardening and irrigation, enhancing sustainability and operational efficiency.

Keywords: renewable energy, hospital, solar energy, rainwater harvesting, sustainable development

Modelling study of light trapping theory to improve performance of solar cells

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PURPOSE: The objective of this research is to investigate the methods by which light trapping can improve the efficiency of solar cells.

METHOD: This will be achieved by utilizing COMSOL Multyphysics software for modelling purposes. The investigation will focus on examining the design and implementation of light trapping structures. It will involve developing simulation methodologies using COMSOL software where heat transfer in solid surface to surface radiation module are being implemented to study the case.

RESULTS: The anticipated outcomes include improved performance metrics and valuable insights that can contribute to enhancing the efficiency and affordability of solar cells.

CONCLUSION: Ultimately, this research aims to promote the wider adoption of solar energy technologies. By developing and implementing advanced light trapping structures, it is expected that solar cells will achieve higher efficiency rates, making photovoltaic systems more cost-effective and competitive in the energy market.

Keywords: light trapping, solar cells, modelling, Comsol Multiphysics.

The Effect of Mitragyna Speciosa Aqueous Extract On Candida Species Biofilms

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PURPOSE: To determine antibiofilm activity of M. speciosa on Candida spp. Method: M. speciosa was extracted using the maceration technique in water. Following that, 6 x 104 cells/mL of C. albicans, C. tropicalis, C. lusitaniae or C. auris was inoculated with 48 mg/mL of extract in the same well. Then, the plate was incubated for 72 hours at 37°C. 0.12% of chlorhexidine (CHX) and yeast peptone dextrose broth served as the positive and negative control, respectively.

RESULTS: C. albicans had the highest biofilm with 0.277 ± 0.003, when treated with M. speciosa. Meanwhile, C. auris had the least biofilm with 0.125 ± 0.001 biofilm when treated with the extract. C. tropicalis showed decreased biofilm when treated with M. speciosa extract compared to the untreated while C. lusitaniae showed an increased biofilm when treated with M. speciosa extract compared to the untreated.

CONCLUSION: The effect of M. speciosa extract on Candida spp. biofilm was species dependent.

Keywords: Candida albicans, Candida tropicalis, Candida lusitaniae, Candida auris, Mitragyna speciosa.

Resource Optimization and Waiting Time Reduction of Emergency Department Using Discrete Event Simulation

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PURPOSE: This study aims to propose a reliable tool for analyzing current ED operations, improving ED bottlenecks and optimizing resource allocation for improving ED service quality and strategically plan their resources to cater the present demands.

METHODS: Discrete Event Simulation (DES) is used to build an ED model by using ARENA Software and its finding identifies the bottlenecks encountered. The variables employed in the model are specified by triage zones: red, yellow, and green. The Red Zone is responsible for treating critical cases, the Yellow Zone is treating semi-critical situations and the Green Zone is utilized to treat all non-critical cases. Four alternative improvements are proposed to resolve the bottlenecks. The proposed alternatives contain new configuration of department resources; doctors and nurses. Input and output values for each alternative are determined through the DES model.

RESULTS: The existing ED system's results suggest that ED resources facing inappropriate utilization rate, while patients experience significant wait times particularly in the Green Triage Zone. The proposed configuration in this study improved the ED bottlenecks. Based on the comparison of all alternatives, Alternative 4 is recommended as the best alternative. Patients' wait times reduce by 52%. High utilization rates of Red Zone Doctors, Green Zone Doctors and Yellow Zone Nurses were successfully lowered from 89% to 85%, 98% to 90% and 91% to 89%, respectively. Meanwhile, Yellow Zone Doctor's poor usage rate increased from 41% to 49%.

CONCLUSION: The study's findings highlight the benefits of the method used and offer key decision makers a decision support tool for resource planning while reducing patients' wait times and improving ED service quality.

Keywords: emergency department, resource allocation, waiting time, discrete event simulation

Optimizing Energy Efficiency and Reliability in Hospitals at Johor through Comprehensive Design of Solar Systems

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PURPOSE: This study investigates the optimization of energy efficiency, cost reduction, and reliability enhancement in hospitals in Johor through the comprehensive design and implementation of solar energy systems.

METHODS: Detailed energy consumption patterns were assessed, and solar potential was evaluated using Helioscope and Pvsyst, leading to tailored system designs. The system's planned power was set at 3.59 MW, covering 17,341 m^2 with 7,980 LR4-72 HPH 450 M G2 modules and three Sungrow SG1250 inverters.

RESULTS: A comprehensive economic analysis indicated promising returns on investment, substantial energy savings, and reduced CO2 emissions. The electrical design, developed using AutoCAD, included precise specifications for PV module selection, racking types, and electrical components. These findings support the adoption of solar energy in Malaysian hospitals, aligning with sustainability goals and improving infrastructure resilience. The methodology included site selection based on geographical and solar data, energy consumption analysis, and solar potential assessment. This research addresses energy challenges in Malaysian hospitals by offering tailored solar solutions, optimizing designs, and conducting cost-benefit analyses to enhance operational efficiency and energy reliability, contributing to a more sustainable healthcare sector in Malaysia.

Keywords: Photovoltaic (PV), solar irradiation, Hospital, Solar Design, Malaysia

Study of Single Mode Fiber Based Sensor using COMSOL

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PURPOSE: This study aims to develop a numerical model to investigate the performance of single-mode fiber-based sensors, focusing on the effects of confinement loss, refractive index, and wavelength.

METHODS: The research methodology involves constructing a numerical model using COMSOL Multiphysics software to simulate the behavior of single-mode fiber sensors. Key parameters, including numerical aperture (NA), V-number, and effective mode area (EMA), are systematically analyzed to understand their influence on sensor performance.

RESULTS: The results demonstrate that a higher core refractive index relative to the cladding increases the NA, which can contribute to increased scattering loss within the fiber. The V-number, a dimensionless parameter, determines the fraction of optical power confined to the fiber core, with a lower V-number indicating a smaller portion of power in the core. Furthermore, the study reveals that a higher NA typically results in a smaller EMA, leading to increased confinement loss and impacting overall signal transmission efficiency.

CONCLUSION: In conclusion, optimizing single-mode fiber-based sensors requires a careful balance between key parameters such as NA, V-number, and EMA. By understanding the interplay among these factors, researchers can design and develop highly efficient and sensitive fiber-optic sensors for various applications, including telecommunications, medical imaging, and environmental monitoring.

Keywords: Single Mode Fiber, Confinement Loss, Sensitivity

Revealing Kuantan's Uncharted Reefs: A Study Utilizing Multibeam Echosounder Surveys and Unsupervised Classification

Aiman Hisyam Bin Azmi

PURPOSE: This study aimed to describe and map previously uncharted nearshore reef areas in Kuantan coastal waters by using MBES. The primary goal was to create a marine habitat map through unsupervised classification based on bathymetric derivatives from a multibeam dataset.

METHODS: Acoustic data covering an area 1km2 for each of three places were acquired using a multibeam echosounder. The data were subsequently processed to produce bathymetry and backscatter. Bathymetric derivatives including slope, northness, eastness, Benthic Position Index (BPI), and Vector Rugosity Measure (VRM) were created Consequently, marine habitat maps were generated by utilizing Iterative Self-Organizing (ISO) Cluster unsupervised classification on bathymetry data and its derivatives. To validate the interpreted data and confirm the precision of habitat maps, ground-truthing techniques such as underwater video transects, and diving surveys were utilized.

RESULTS: This study presents the foundational steps for creating a comprehensive predictive tool that utilizes multibeam echosounder and unsupervised classification to classify the seafloor into nearshore reef distribution maps. The data on nearshore reefs distribution could serve as the nexus for better planning and management frameworks that balance the ecological, social and economic dimensions of sustainable development.

Keywords: Multibeam Echosounder, Unsupervised Classification, Nearshore Reefs, Bathymetric Derivatives

Double Layer of PDMS-Based Composite as an Alternative Method in Radiation Shielding

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PURPOSE: Fabrication of tin and PDMS polymer through the layering method can be an innovation in radiation shielding applications. Application: The tin metal, which has a high atomic number (Z=50) holds the potential as the lead replacement for shielding material. Hazard issues solution can possibly be solved with the PDMS-Based Composite by loading it with tin filler.

METHOD: The materials used in this project are PDMS, tin metal powder and binder. The fabricated layered composite thickness of 5 mm was prepared in two conditions, at room temperature for 48 hours and at 125°C for 20 minutes. The composites then analysed under the Field Emission Scanning Electron Microscopy (FESEM) by using cross-sectional observation with magnification of 100x,1kx, and 10kx.

RESULTS: FESEM images exhibit good morphological structure for composite at room temperature because the polymer at 125°C shrinks compared to polymer at room temperature. Moreover, at the same temperature, double layer gives good results of lower porosity intensity compared to single layer pure tin and polymer.

CONCLUSION: Double layers technique of PDMS- based composite by loading with tin filers at room temperature lock the potential as radiation shielding besides that it is also having a potential to be used as shielding coatings to increase the radiation performance in radiotherapy. The results provide significant benefits to humanity and are aligned with MySTIE (Medicine and Healthcare) as well as Sustainable Development Goal 3 (SDG 3) of Good Health and Wellbeing.

Keyword: lead replacement material, metal polymer composite, layering technique fabrication, composite surface morphology

TIN-PDMS Composite: Innovative Structure as A Shield Against Ionizing Radiation

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PURPOSE: This study assesses the structural and potential radiation absorption properties of the composites fabricated from tin powder and polydimethylsiloxane (PDMS) liquid.

METHOD: PDMS liquid is enriched with 20% tin powder and allows for solidification at different temperatures (25, 100 and 125 °C). The structural analysis is performed using Field Emission Scanning Electron Microscopy with Energy Dispersive X-ray spectroscopy (FESEM-EDX).

RESULTS: Tin-PDMS composites for each curing process demonstrate uniform and homogenous dispersion of tin powder. High porosity can be observed in the sample cured at room temperature, with porosity decreasing in the order of room temperature > 125 °C > 100°C. Regarding the weight percentage of oxygen content, it decreases in the following order: room temperature > 125 °C > 100 °C.

CONCLUSION: Tin-PDMS composites cured at 100 °C can potentially replace lead-based shielding, offering effective protection for healthcare workers and patients from unintended exposure to ionizing radiation.

Keywords: Metal and polymer composite, radiation characteristic, radiation shielding and photon-Ray

Adaptive PID-Like Neural Network Optimized Using Genetic Algorithm for Swing Control of a Gantry Crane System

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PURPOSE: This proposal aims to improve the current version of gantry crane control by developing a genetic algorithm-optimized adaptive PID-like neural network for swing suppression with the presence of payload hoisting and then simulating the system in MATLAB to make it more accurate, flexible, and efficient when controlling its swing with payload hoisting.

METHOD: The control system's performance under practical conditions can be thoroughly evaluated through the building of simulations using MATLAB software, which effectively acts as a virtual testing ground. The simulations will validate the aims, promising significant advancements in the industrial field.

RESULTS: This innovative approach, integrating genetic algorithms and adaptive neural networks, is expected to enhance gantry crane control, yielding a fast, precise, and adaptable system capable of managing load hoisting.

CONCLUSION: The proposed approach ensures the improvement in gantry crane control through the integration of adaptive methods.

Keywords: Overhead crane, Adaptive Proportional Integral Derivative (APID), Neural network, Genetic algorithm, Hoisting.

Study of Single Mode Fiber Based Sensor using COMSOL

Mardhiah Binti Nashahar[1], Marinah Binti Othman[1]
[1]Electrical and Electronic Department, Faculty of Engineering and Built Environment, University Sains Islam Malaysia

PURPOSE: This study aimed to develop a numerical model to investigate the performance of single-mode fiber-based sensors, focusing on the effects of confinement loss, refractive index, and wavelength.

METHODS: The research methodology involved constructing a numerical model using COMSOL Multiphysics software to simulate the behavior of single-mode fiber sensors. Key parameters, including numerical aperture (NA), V-number, and effective mode area (EMA), are systematically analyzed to understand their influence on sensor performance.

RESULTS: The results demonstrate that a higher core refractive index relative to the cladding increases the NA, which can contribute to increased scattering loss within the fiber. The V-number, a dimensionless parameter, determines the fraction of optical power confined to the fiber core, with a lower V-number indicating a smaller portion of power in the core. Furthermore, the study reveals that a higher NA typically results in a smaller EMA, leading to increased confinement loss and impacting overall signal transmission efficiency.

CONCLUSION: Optimizing single-mode fiber-based sensors requires a careful balance between key parameters such as NA, V-number, and EMA. By understanding the interplay among these factors, researchers can design and develop highly efficient and sensitive fiber-optic sensors for various applications, including telecommunications, medical imaging, and environmental monitoring.

Keywords: Single Mode Fiber, Confinement Loss, Sensitivity

A Comprehensive Study on Potential of Solar PV Installation at USIM For Sustainable Energy Solutions

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PURPOSE: The purpose of this study is to evaluate the potential for solar photovoltaic (PV) installation at Universiti Sains Islam Malaysia (USIM) as a sustainable energy solution. The research aims to determine the feasibility, efficiency, and impact of solar PV systems in reducing the university's reliance on conventional energy sources and contributing to its sustainability goals.

METHODS: The study utilized a combination of qualitative and quantitative approaches. The research involved:

- Site Analysis: Evaluating potential locations at USIM for solar PV installation, considering factors such as solar irradiance, shading, and structural suitability.

- Energy Assessment: Calculating the potential energy generation based on the site conditions and available solar resources.

- Cost-Benefit Analysis: Estimating the financial implications of installing solar PV systems, including the initial investment, maintenance costs, and expected savings from reduced energy bills.

- Environmental Impact Assessment: Assessing the potential environmental benefits, such as reduced carbon emissions, from using solar PV instead of conventional energy sources.

RESULTS: The study found that USIM has significant potential for solar PV installation, with several sites identified as suitable for maximizing solar energy generation. The energy assessment indicated that a substantial portion of the university's energy needs could be met through solar PV, leading to significant cost savings over time. The cost-benefit analysis demonstrated a favorable return on investment, with the system paying for itself within a reasonable period. Additionally, the environmental impact assessment showed a considerable reduction in carbon emissions, aligning with USIM's sustainability objectives.

CONCLUSION: The research concluded that installing solar PV systems at USIM is a viable and beneficial initiative. It would not only provide substantial economic savings but also contribute to the university's commitment to sustainability. The study recommends moving forward with the implementation of solar PV projects, starting with the most promising sites identified, and integrating solar energy into the university's long-term energy strategy.

Keywords: renewable energy, Solar Photovoltaic (PV), Sustainable Energy,Site Analysis, Cost-Benefit Analysis, Environmental Impact

Effect of cycloplegic refraction on accommodation and vergence parameters in myopic Malay young adults

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PURPOSE: To evaluate the effect of CR on accommodation and vergence parameters and determine the relationship between the impact of CR and NCR on accommodation and vergence parameters.

METHODS: A prospective clinical study was conducted among forty-eight myopic Malay young adults with a mean age of (21.29 ± 1.47 years) and 70.8% were female at the International Islamic University Malaysia (IIUM) Optometry Clinic from October 2023 to June 2024. Clinical procedures of non-cycloplegia refraction (NCR) and CR were performed. One drop of 1% tropicamide followed by one drop of 0.5% phenylephrine was administered for CR. Then, accommodation and vergence parameters were measured for each subject under NCR and CR. Then, we compared the data of the sphere equivalent refraction (SER), accommodation and vergence parameters between CR and NCR.

RESULTS: The values of the spherical equivalent (SER) statistically significantly differed between CR and NCR (mean difference = 0.17 ± 0.25 D; $p < 0.05$). CR was less myopic than NCR. However, the difference in accommodation and vergence parameters was statistically insignificant ($p > 0.05$).

CONCLUSION: Although statistically, the statistical difference was found in SER between the two modes of refraction, the data does not show clinical significance. The effect of accommodative and vergence changes after the instillation of cycloplegia agents was also insignificant. It is suggested that the NCR can be performed to obtain the refractive error findings among Malay young adults with myopia.

Keywords: Cycloplegic Refraction, Non-cycloplegic Refraction, Tropicamide, Accommodation, Vergence

Feasibility Study on a Development of a Wind Turbine Energy Generation System as an Alternative for USIM's Hospital at Jason Bay, Johor

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The Malaysian government is advancing power generation through renewable energy (RE) to align with global sustainability goals. Concurrently, a hospital is planned for Jason Bay, Johor, to provide essential medical training facilities for Universiti Sains Islam Malaysia (USIM). To meet increasing electricity demands in hospitals while mitigating financial strains, the proposed hospital will primarily harness solar energy, supplemented by wind power from turbines. This thesis conducts a comprehensive feasibility study on integrating RE sources into the USIM Hospital project, focusing specifically on wind energy as a supplement to solar. Through meticulous data analysis and evaluation, the research aims to assess the viability and potential of wind energy development in Malaysia. By utilizing data from reputable sources such as the Malaysian Meteorological Department (MMD), the study will identify the most suitable wind turbine models for the local environmental conditions. Advanced simulation techniques using Ansys Fluent software will be employed to simulate the performance and efficiency of the selected wind turbine models. Analyzing these simulation results will provide valuable insights into the functionality and effectiveness of the proposed wind energy system, facilitating informed decision-making in the project's implementation phase. This research significantly contributes to advancing renewable energy initiatives in Malaysia, aiming to reduce reliance on non-RE sources and curb emissions. Through rigorous feasibility assessment and simulation analysis, the thesis lays the groundwork for the successful integration of RE solutions, ensuring a sustainable and environmentally responsible energy supply for the USIM Hospital and similar projects nationwide.

Keywords: renewable energy, wind energy, wind turbine

Simulative Engineering and Study of a Gauze Cutting and Folding Machine Prototype

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PURPOSE: The main objective of this study is to design and simulate the operation of an automated machine capable of both cutting and folding gauze. This involves creating a virtual model to evaluate its performance and identify potential improvements prior to physical prototyping.

METHODS: Using advanced computer-aided design (CAD) software, the machine's components, including cutting blades, folding mechanisms, and control systems, were modeled. Simulation tools were employed to analyze the functionality of the machine, focusing on the precision of cutting and folding, operational speed, and material handling efficiency. The simulations aimed to optimize the system by identifying and addressing potential issues in the design phase.

RESULTS: The simulations demonstrated that the automated gauze cutting and folding machine could achieve a cutting precision within 0.5 mm and consistent folding accuracy. The virtual prototype showed a 70% reduction in processing time compared to manual methods and significantly minimized material wastage. These results indicate that the design is feasible and effective for the intended medical applications.

CONCLUSION: The simulative engineering approach has successfully guided the development of a prototype for an automated gauze cutting and folding machine. The study underscores the advantages of using simulation to optimize design and functionality before physical prototyping.

Keywords: Gauze folding machine, Automated gauze cutting, CAD modeling

Hydrogel Effect on Solar Photovoltaic by Using Heat Transfer Module in COMSOL Multiphysics

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PURPOSE: The objectives were to model the solar panel with the synthesis of hydrogel in COMSOL Multiphysics, to investigate the potential of hydrogels in enhancing solar PV performance, and to analyze the efficiency gains of solar panels through hydrogel using the heat transfer module.

METHODS: The research method involved utilizing the COMSOL Multiphysics Heat Transfer Module to simulate models, analysing how hydrogel affected heat transfer dynamics, optimizing hydrogel configurations to maximize heat absorption while minimizing the risk of overheating, and evaluating the economic feasibility of hydrogel-based solar PV systems.

RESULTS: The result of this investigation demonstrates the effectiveness of hydrogel materials in enhancing the electrical performance of solar panels and mitigating overheating issues. These improvements positively impact the electrical performance and overall efficiency of the solar photovoltaic system.

CONCLUSION: Thus, the efficiency of solar panels, potentially revolutionising the utilisation of solar energy, can be enhanced.

Keywords: Solar, overheating, hydrogel, COMSOL Multiphysics

Resource Optimization and Waiting Time Reduction of Emergency Department Using Discrete Event Simulation

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[1]Department of Computational and Theoretical Sciences, Kulliyyah of Science, International Islamic University Malaysia

PURPOSE: This study aims to propose a reliable tool for analyzing current ED operations, improving ED bottlenecks and optimizing resource allocation for improving ED service quality.

METHODS: Discrete Event Simulation (DES) is used to build an ED model by using ARENA Software and its finding identifies the bottlenecks encountered. Meanwhile, the variables used in the model are specified by triage zones. Four alternative improvements are proposed to resolve the bottlenecks. The proposed alternatives contain a new configuration of department resources, doctors and nurses. Input and output values for each alternative are determined through the DES model.

RESULTS: The existing ED system's results suggest that ED resources are facing inappropriate utilization rate, while patients experience significant wait times particularly in the Green Zone. The proposed configuration in this study improved the ED bottlenecks. Based on the comparison of all alternatives, Alternative 4 is recommended as the best alternative. Patients' wait times reduce by 52%. The utilization rates of Red Zone Doctors, Green Zone Doctors and Yellow Zone Nurses are successfully lowered from 89% to 85%, 98% to 90% and 91% to 89%, respectively.

CONCLUSION: The study's findings highlight the benefits of the method used and offer key decision makers a decision support tool for resource planning while reducing patients' wait times and improving ED service quality.

Keywords: emergency department, resource allocation, waiting time, discrete event simulation

Water Quality Inspection System Integrated with TF mini-s LIDAR, pH sensor and IoT monitoring system

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The portable water quality inspection system is an innovative solution designed to address the limitations of current water quality monitoring methods in Malaysia. This system integrates high-sensitivity optical sensors (TF Mini-S LIDAR) and pH sensors to assess water quality by measuring turbidity and pH levels. It leverages the Internet of Things (IoT) through an ESP32 microcontroller to transmit real-time data to mobile devices, facilitating immediate analysis and response. This system aims to provide an efficient and resource- effective alternative to manual sampling and laboratory analysis, which are often time- consuming and costly. By conducting multiple experiments with water samples from various locations, the system demonstrated its potential in offering early detection of contaminants, thus contributing to the preservation of water resources and ensuring safe water for drinking, agriculture, and industrial uses. The real-time monitoring capabilities and data analysis features make this system a promising advancement in water pollution inspection technology.

The portable water quality inspection system is designed to enhance the efficiency and accuracy of water quality monitoring. The core components include a TF Mini-S LIDAR sensor for detecting turbidity and a pH sensor for measuring the pH levels in water. These sensors are integrated with an ESP32 microcontroller, which serves as the central processing unit for data collection and transmission.

Optimising In Vitro Maturation Protocols for Conservation Breeding Of Proboscis Monkeys (Nasalis Larvatus) Using Wild Macaques (Macaca Fascicularis) as A Model

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Planetary health and animal conservation are inextricably linked since biodiversity issues will impact the populations of many wildlife species in their environment. Primates are one of the wildlife species that face rapid extinction in their population, especially those endemic to a certain geographical location. The Proboscis monkey (Nasalis larvatus), is the endemic primate species in Borneo Island, distributed along Sabah wet areas. Proboscis monkeys are threatened by converting riparian and coastal mangrove habitats to plantations, which may result in habitat fragmentation and local extinction. An alternative approach to in situ conservation includes gene banking and the use of assisted reproductive technologies (ART), such as oocyte in vitro maturation (IVM) and in vitro fertilisation (IVF). While some 'high- tech' solutions may not be practical for wildlife conservation, research and development of these emerging tools can provide valuable information for optimising techniques and implementing ART as a routine practice in conservation efforts. The availability of mature, developmentally competent oocytes is a significant barrier to ART success. Oocyte maturation depends on many nuclear and cytoplasmic components, which can be influenced by maturation conditions and female age. In vitro maturation has varying success rates across the species tested. In monkeys, IVM oocytes have lower developmental ability after fertilisation than in vivo (IVO) oocytes. This study aimed to optimise a protocol in vitro maturation for Proboscis monkey IVM oocytes using a long-tailed monkey (Macaca fascicularis) as a model. Using this model, the meiotic developmental capacity of oocytes from unstimulated macaque have been compared: (i) in vitro matured oocytes from three commercialised base mediums, M199, TALP-HEPES and CMRL-1066, (ii) optimising in vitro maturation protocols of selected base media (CMRL-1066), (iii) grading in vitro matured oocytes base on Oocytes Grading System.

Development Of Real-Time State of Health (SOH) Data Using Node-Red For Jayalax Resources Battery Monitoring System (BMS)

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PURPOSE: The objective of this research is able to monitor the state of charge (SOC) and state of health (SOH) and then include state of charge (SOC) and state of health (SOH) in BMS dashboard system for Jayalax Resources

METHODS: The project implemented a real-time battery health monitoring system using Node-RED to collect and process data, focusing on monitoring the State of Health (SOH) of batteries at Jayalax Resources. Node-RED was selected for its efficiency in managing IoT data streams, enabling seamless integration with sensors that track key battery parameters like voltage, current, and temperature. The SOH was calculated through an estimation technique within Node-RED, with results displayed in real-time on interactive dashboards via Looker Studio and analysis is perform at Google Sheet facilitating continuous analysis and early detection of potential battery issues.

RESULTS: Looker Studio was used to create a BMS dashboard, enhancing the accessibility and interpretability of the data. The DRE method demonstrated consistently smaller percentage errors (3.0%, 4.0%, 5.3%) compared to the OCV method (3.4%, 4.3%, 8.1%), highlighting its higher accuracy for real-time SOH monitoring. Due to its better accuracy, DRE was chosen as the ideal algorithm for the dashboard. The project's use of Looker Studio and Google Sheets successfully met its objectives, providing a strong foundation for further advancements in BMS, leading to more precise battery performance and health assessments

CONCLUSION: The project successfully implemented two State of Health (SOH) calculation algorithms, Open Circuit Voltage (OCV) and Direct Resistance Estimation (DRE), using Node-RED software. Testing showed that the DRE method consistently offered higher accuracy with lower percentage errors compared to OCV. The real-time SOH data from the DRE algorithm was effectively displayed on a BMS dashboard via Looker Studio, meeting the project's objectives and laying a strong foundation for future advancements in battery monitoring systems.

Keywords: state of charge, state of health, real-time, Node-RED, open circuit voltage.

Enhancing GaN Porosification with Innovative Low Temperature Alternating Current Photoelectrochemical Etching

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PURPOSE: This study aims to analyse the effects of a low temperature alternating current electrochemical etching method on GaN porosification by varying the etching duration.

METHODS: Undoped GaN on sapphire substrate with a thickness of 5 µm was used in this study. The novelty of this study lies in the use of a new method: ACPEC etching at a low temperature of less than 15°C. The etching duration varied, starting at 45 min and increasing in 15 min increments up to 90 min, using a 4% KOH solution as the electrolyte and a Pt wire as the counter electrode.

RESULTS: FESEM images reveal a mountainous structure with hexagonal and microridges pore shapes. At high magnification, the surface morphology appears tiered and multilayered. AFM results confirmed the multilayered surface leads to an increase in surface roughness. There was an apparent shift towards shorter wavelengths and an increase in the E2 (high) peak for all porous samples compared to as grown, with the peak shifting by 1.04 cm-1.

CONCLUSION: This finding concluded that the method of low temperature ACPEC etching of porous GaN can be used to obtain the high porosity and high performance for future optoelectronic devices.

Keywords: Gallium Nitride, Electrochemical, Low Temperature, FESEM, alternating current

Portable Mini Solar Dryer

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PURPOSE: this study aims to design, develop and investigate the thermal performance of an Evacuated Glass-Thermal Absorber Tube Collector (EGATC) for air heating applications.

METHODS: EGATC was designed from a conventional HP ETC, and the performance was compared through parameter and performance experimental setup. The three days performance experiments showed EGATC performed better with daily outlet temperature increased by 9.0%, 7.2%, and 4.9%, respectively, with an average of 7.0% compared with HP ETC. EGATC also had greater efficiency compared to HP ETC, with the average efficiency for EGATC being 51.3% compared with HP ETC's 41.8%. EGATC's inner absorber was designed to create a double pass flow with the ventilated chamber.

RESULTS: The parameter experiment shows the design could increase the outlet temperature by a difference of 6.3% (for stainless- steel inner absorber compared with insulation material inner absorber). Regarding energy storage, the stainless-steel inner absorber also had an advantage compared to the insulation material inner absorber, with a 1.3% difference. On the effect of other parameters such as inner absorber surface area air contact (perforated fin), outer absorber selective coating surface, outer absorber wall thickness, double layer non-vacuum glass tube, single layer transparent outer glass tube, and single-layer thin film inner glass tube was investigated by parameter experimental setup on energy storage. It was proven that the outlet temperature, energy store, and energy buffer could be enhanced with the combination of wind speed 0.9 m/s, zero (0) perforated fin, non-coating outer absorber, and 1mm outer absorber wall thickness. It was also reported that double-layer vacuum glass tubes promise better thermal performance enhancement compared with double-layer non-vacuum glass tubes, single layer transparent outer glass tubes, and single-layer thin film inner glass tubes. The mathematical equation of each EGATC component was formulated based on the first law of thermodynamics. The total acceptable error of 5% shows that the model at each node was valid. The performance curves for those 0 fins (equation), 0 fin (experimental), and 3 fins (experimental) were obtained. The results showed that the efficiency (collector + storage) was affected by the number of fins. The efficiency (collector + storage) was 68.7%, 71.2%, and 71.0%, respectively.

CONCLUSION: The application of EGATC in air heating applications proved beneficial to the application of solar drying processes, especially in equatorial climate countries such as Malaysia. Furthermore, it can be applied as one of the home appliance as a Portable Mini Solar Dryer.

Evaluation of Coral Microfragmentation Method as Active Coral Restoration Reared in Indoor Aquaria

Hazrul Amirul bin Johari

World oceans and its marginal seas cover almost 71 percent of earth surface and coral reef ecosystem are home to large number of marine organisms compared to another shallow marine ecosystem. Thus, coral reef ecosystem is one of the most diverse ecosystem equivalents to terrestrial rainforest. However, in the recent trend of high temperature rise globally shows a negative impact towards coral reef ecosystem apart from human induced stress. Human intervention are necessaries to restore degraded coral reef. In this study, the main objective is to compare the growth rate and survival of four coral species, Porites lobata, Dipsastrea speciosa, Turbinaria reniformis and Montipora spp using microfragmentation method reared in controlled environment of indoor aquaria. The results indicate that Dipsastrea speciosa have the fastest growth rate compared to other species with 48.1 % increase from initial size and Montipora spp have the slowest growth rate (1.2%). Among the species, there were significant difference in term of survival rate (One-way ANOVA, $P< 0.05$). Dipsastrea speciosa have 100% survival rate and significantly different that Porites lobata and Turbinaria reniformis (Turkey's HSD, $P< 0.05$). While Montipora spp have the lowest survival rate (52.5%). Microfragmentation method were used to promote growth for slow growing coral genera. Thus, diversify coral species used for coral restoration.

Galvanic Corrosions Progression Analysis at Aluminium-Steel Contacts in ACSR Overhead Conductors

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PURPOSE: This study investigates the progression of galvanic corrosion at the aluminum-steel contact points in both round (RW) and trapezoidal wire (TW) ACSR overhead conductors.

METHODS: The corrosion is assumed to occur uniformly across the contact area, and therefore, a simple two-dimensional (2D) model using COMSOL Multi-physics software is employed to simulate this phenomenon. The contacts undergo corrosion over a period of 360 days, with structural deformations observed at the contact points.

RESULTS: The findings reveal that galvanic corrosion is more severe in ACSR/RW conductors, exhibiting a recorded loss of over 14% of the contact area, compared to 12% in ACSR/TW conductors. This deformation can also translate into a reduction in the conductor's ability to conduct electrical current, with an ampacity reduction of approximately 14% observed in ACSR/RW conductors after 360 days under tested environmental conditions.

CONCLUSION: These results underscore the critical importance of implementing effective monitoring systems to detect and assess the progression of corrosion on overhead conductors.

Keywords: overhead conductors, galvanic corrosion, performance.

Study of Photonic Crystal Fiber based Surface Plasmon Resonance as sensor

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This chapter explains Photonic Crystal Fiber (PCF), a type of optical fiber known for its excellent light management, especially in sensing. The first part covers PCF's unique features and design, showing how it accurately controls light to detect substance changes. The second part discusses PCF-based Surface Plasmon Resonance (SPR) simulations, highlighting how PCF-SPR sensors detect environmental changes with high sensitivity. Readers will gain a clear understanding of PCF's potential in sensing technologies, from basic concepts to advanced simulations, and its applications in biochemical analysis, environmental monitoring, and more. We propose a new photonic crystal fiber (PCF) based surface plasmon resonance (SPR) sensor for detecting refractive index (RI) in the visible to near infrared range (500–2000 nm). Using the finite element method (FEM) in COMSOL, we study how different geometric parameters affect sensor performance. Gold (Au) is used as the plasmonic material to create excitation between the core and plasmonic mode. The sensor has a rectangular core on a pure silica (SiO_2) substrate to enhance coupling strength between the core and surface plasmon polariton (SPP) mode, improving sensing performance. By adjusting geometric parameters, we achieve a maximum wavelength sensitivity of for x polarization and for y polarization for analyte refractive indices between 1.37 and 1.42. The amplitude sensitivity reaches can be found for x polarization and y polarization. With strong coupling strength, high sensitivity, high FOM, and improved resolution, this sensor is ideal for real-time, low-cost, and accurate detection of biomedical analytes, biomolecules, and organic chemicals. In conclusion, Photonic Crystal Fibers (PCFs) are special fibers that guide light within them, which can be used for detecting various substances by measuring changes in light. Meanwhile, these fibers are useful in many areas, like testing for chemicals and monitoring the environment, because they can sense very small changes. Therefore, PCFs are better than regular fibers because they can be designed to work exactly as needed for different tasks.

A Scoping Review of The Challenges in Implementing Biosafety Among Laboratory Users

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PURPOSE: This review aims to provide a comprehensive map of previously published studies on the challenges in implementing biosafety among laboratory users.

METHODS: This scoping review examined the challenges in implementing biosafety among laboratory users. Three main databases, Scopus, Science Direct and EBSCo Discovery Service (EDS) sources were consulted to find appropriate articles.

RESULTS: A scoping review has identified six themes for the challenges in implementing biosafety in the laboratory, namely awareness, communication, funding, governance, management, and training. Training is found to substantially impact challenges in implementing biosafety in the laboratory.

CONCLUSION: Laboratory biosafety is a relatively new and evolving paradigm for bioscience laboratories in Malaysia. In compliance with this legislation, there will be a need for major changes in organizational and workplace culture. Successful implementation would also require awareness training, sufficient resources, and a culture of responsibility among laboratory users.

Keywords: Biosafety, Challenges, Implementation, Laboratory

VR Safe Kitchen: Revolutionizing Safety Training for TVET Educational Tool

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PURPOSE: This innovative VR-based educational tool enhances safety training for TVET students in commercial kitchens, such as those in restaurants, hotels, and catering businesses. It aims to develop and validate a VR-safe kitchen framework through academia-industry collaboration, revolutionizing hazard education and preparing future kitchen professionals for workplace safety. The rise in unreported kitchen incidents highlights the need for practical safety training. Traditionally, kitchen staff focus on food safety per Ministry of Health regulations, often neglecting personal safety, which leads to frequent accidents such as burns, cuts, and slips. Risks are further increased by heavy lifting, faulty equipment, and harmful chemicals. This VR tool addresses these issues by providing in-depth safety training, reducing accidents, and fostering a safer work environment. Integrating advanced technology into safety training supports national goals of modernizing education and empowering the hospitality and food service workforce.

METHODS: The tool's development and validation involved interviews with 16 kitchen, occupational safety, IT, and instructional design experts, following the ADDIE Model. This study consulted 10 instructional design experts with TVET module experience for validation.

RESULTS: A Fuzzy Delphi method using Microsoft Excel FD analysis template 2.0 identified six essential elements for successful VR implementation: technology infrastructure, prototype creation, engagement craft, personalised learning support (feedback and guidance), dynamic difficulty adjustment, and skill development through realistic simulations.

CONCLUSIONS: Insights from this analysis promise to enhance food safety practices and reduce health hazards in kitchens. Adaptive learning systems in VR classes offer personalised education, adjusting complexity based on individual abilities and enhancing skill development. By simulating real-world scenarios, VR promotes active participation and motivation among students. The study recommends integrating VR tools to enrich learning experiences in TVET programmes.

Keywords: Commercial Kitchen Safety; Hazard Education; Kitchen Incident Prevention; TVET Students; VR Safety Training

Enhancing Vehicle Routing Problem Solutions for Sustainability: A Multi-Heuristic Approach with Load Factor Integration

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PURPOSE: The research examines the effectiveness of combining multiple heuristic methods, specifically local search operators, with this incorporated load factor. While a single local search operator can improve solution quality, we hypothesize that using multiple operators in a search strategy leads to further optimization.

METHODS: We analyze the performance of two powerful heuristics: the composite and multi-level methods. Both methods involve applying improvement schemes sequentially with various local search operators. The key difference lies in how the search is directed after implementing a scheme. We evaluate these methods using 46 well-established VRP instances.

RESULTS: Our findings reveal that the multi-level heuristic, on average, achieves solutions comparable to the composite heuristic when using the same parameters. The difference in solution quality is minimal. Notably, the multi-level method exhibits significantly faster computation times.

CONCLUSION: This performance analysis provides valuable insights for developing further refinement methods that integrate the load factor. Applying these methods to real-world case studies presents an exciting future direction. Businesses can leverage these findings to optimize their transportation services, leading to both economic and environmental benefits.

Keywords: Green vehicle routing problem, multi-level heuristics, composite heuristics

Optimization of Solar Hybrid Gravity System with Battery Energy Storage for Elevation Systems

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This research studies the performance and efficiency of a solar hybrid gravity system integrated with battery energy storage. The objective is to optimize the design of a solar hybrid gravity system using Solar PV 50-Watts, SLA (18Ah) Battery and Water Gravity Energy Storage Tank. Energy consumption is measured using SLA (18 Ah) Battery, Solar PV (18Ah) and 22-Watts water Pump at different heights of Water Tank and to quantify efficiency improvements that reduce energy consumption and extension of battery lifespan. The methodology involved three procedures with five data loggers: a flow meter, a pyranometer, and three units of watt meters. First, the system uses a fully charged SLA (18Ah) Battery at different heights of Circulation Water Tank (1.5m, 2m, 2.5m, 3m, and 3.5m) every 15 minutes. Second, the system uses 50-watt solar PV directly at 3 meters height. Third, the system uses Solar Hybrid Gravity System with Battery Energy Storage at 3 meters height in seven days monitoring. Results show that energy consumption for solar hybrid gravity system was reduced to 50% and doubled the battery lifespan. The SLA (18Ah) Battery shows a charging and discharging loss is 22.1% with 5% of Deep of Discharge (DOD) while the 22-Watt Water Pump achieved rate of 11.0 L/min at peak solar radiation, with a maximum motor power of 24.32 Watts. In conclusion, this study was successfully optimizing the solar hybrid gravity system on efficiency improvements, reducing battery dependency and doubled the battery lifespan that making it a sustainable solution for elevation applications.

Keywords: Solar energy, gravity energy storage, battery efficiency, water pumping, energy optimization.

SiCekaMmunity: IIUM Persatuan Seni Silat Cekak Malaysia Hub

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PURPOSE: This project aims to develop a centralized web-based application for Persatuan Seni Silat Cekak Malaysia in IIUM that will digitalize all the business in the club such as new member registration and class management system.

METHODS: SiCekaMmunity is developed using Laravel PHP framework. A survey was conducted regarding the features of the application that need to be included in the system before it is developed. A series of interviews with the instructors were conducted as well to get their opinion on the existing system features that are needed for the newly built system. To ensure the development process is following the standards, it is developed using the Software Development Life Cycle (SDLC) where it consists of seven stages including planning & ideation, requirement gathering, requirement analysis, design, development, testing, and deployment. Apart from that, the development of the system includes the functional requirements which are the features of the system and non-functional requirements which are the general properties of the system.

RESULTS: The system's web pages were designed for optimal user interaction, tailored for guests, administrators, instructors, and members. Guests could access general information like the homepage and event pages. Administrators had a dashboard to manage club info, events, member progress, and feedback. Instructors could manage classes, track progress, and register for events. Members had dashboards to view club info, enroll in classes, check event calendars, provide feedback, and monitor their progress.

CONCLUSION: The Si CekaMmunity web application effectively addressed PSSCMIIUM's administrative challenges, streamlining membership management and event coordination. Built on Laravel, the application received positive feedback, demonstrating the value of modernized data management for organizational effectiveness and member engagement.

Keywords: Laravel, software development life cycle (SDLC), Persatuan Seni Silat Cekak Malaysia IIUM (PSSCMIIUM), class management system, user dashboard.

Collagen Extract from Red Tilapia Fish Skin and It's Characterization as Natural Wound Healer

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PURPOSE: The aim of current research was to extract the collagens from the skins of red tilapia fish (Oreochromis niloticus) and explore the potential of red tilapia fish skin-derived collagen in accelerating wound healing process as well as to study its properties.

METHODS: Extraction of acid soluble collagen (ASC) from tilapia skin, as well as determination of their yield and characterization by using Fourier Transform Infrared Spectroscopy FTIR spectra and in vitro scratch assay were conducted.

RESULTS: ASC has a yield of 53.4% based on dry basis. Based on FTIR spectra, the collagen was classified as type I collagen with triple helical structure (Amide A, I, II, III). The results of in vitro scratch assay indicate ASC could accelerate wound healing process.

CONCLUSION: Therefore, ASC represented an excellent potential candidate as an alternative source for collagen production.

Keywords: tilapia skin, collagen, wound healing

High-Resolution Retinal Vascular Imaging and Analysis System

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PURPOSE: This study aims to develop and evaluate the High-Resolution Retinal Vascular Imaging and Analysis System (HRVIAS), an advanced diagnostic tool designed to improve the evaluation and monitoring of retinal vascular health.

METHODS: HRVIAS utilizes high-resolution retinal images (2048x2048 pixels) and incorporates deep learning models specifically trained for vascular feature segmentation. The system employs adaptive thresholding methods and fractal dimension analysis to enhance image clarity and provide quantitative measures of retinal vascular complexity. ROC analysis is used to determine cut-off values for fractal dimension assessments, and the system is designed for both high-performance computing systems and more modest specifications to ensure broad accessibility.

RESULTS: The HRVIAS demonstrated superior performance in segmenting and analyzing retinal vascular features compared to traditional methods. The adaptive thresholding technique provided significant improvements in the visibility of vascular structures, and fractal dimension analysis yielded precise quantifications of vascular complexity. ROC curve analysis indicated high diagnostic accuracy for various ocular diseases, including Age-related Macular Degeneration (AMD), Diabetic Retinopathy (DR), and Glaucoma.

CONCLUSION: The HRVIAS represents a significant advancement in ocular health diagnostics by leveraging cutting-edge technology to enhance diagnostic accuracy and early disease detection. Its ability to provide detailed risk assessments and improve the visibility of retinal structures makes it an invaluable tool for practitioners, ultimately leading to better patient outcomes.

Keywords: Retinal imaging, deep learning, vascular segmentation, adaptive thresholding, fractal dimension analysis.

Histopathological Evaluation of Three-dimensional Printed Thermoplastic Polyurethane and Polylactic Acid Scaffolds in Renal and Hepatic Rat Tissues for Tracheal Tissue Engineering

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PURPOSE: To investigate the histopathological effects of 3D-printed TPU and PLA scaffolds on kidney and liver tissues in animal models as potential materials for tracheal replacement.

METHODS: 25 male Sprague Dawley rats were subcutaneously implanted with 3D-printed TPU/PLA scaffolds. Post-surgery, animals were monitored for eight weeks, after which histopathological assessments were performed on explanted kidneys and livers. Tissues were processed and stained using hematoxylin and eosin to evaluate potential toxicity.

RESULTS: Histopathological analysis revealed that the kidney glomeruli and proximal convoluted tubules of rats with implanted scaffolds displayed normal morphology with no signs of inflammation, edema, or infiltration of inflammatory cells. Similarly, liver tissue exhibited normal architecture, with organized hepatocyte cords and sinusoids, and no pathological changes such as cysts, fibrosis, necrosis, or lymphocyte aggregates were observed. No mortality or abnormal behavior was noted during the study period, indicating the scaffolds' biocompatibility and non-toxicity.

CONCLUSION: The in vivo study demonstrates that 3D-printed TPU/PLA scaffolds do not induce adverse histopathological effects on kidney and liver tissues, supporting their potential as safe materials for long-term biomedical applications, including tracheal replacements. These findings highlight the promise of combining TPU and PLA for developing biocompatible and mechanically suitable scaffolds for organ transplantation.

Keywords: histopathology, kidney, liver, thermoplastic polyurethane, polylactic acid

Fabrication and Analysis of Tin-Polydimethylsiloxane (PDMS) Composite Layers for Enhanced Radiation Shielding: An Alternative to Lead (Pb) Material.

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PURPOSE: Fabrication of tin and PDMS polymer using a layering method is an invention in radiation shielding application.

METHODS: The materials used in this project are PDMS polymer liquid, tin metal powder and PDMS binder liquid. The 5 mm thick composite was cured in two conditions, namely room temperature and 125°C. The composites were then analysed under the Field Emission Scanning Electron Microscopy (FESEM) using cross-sectional observation with magnification of 100x,1kx, and 10kx.

RESULTS: FESEM images exhibit good morphological structure for the composite at room temperature compared to 125°C due to polymer shrinkage. Moreover, at the same temperature, the double-layer shows a lower porosity intensity compared to pure tin and single-layer polymer.

CONCLUSION: The double-layer technique of PDMS-based composite loading with tin fillers at room temperature holds radiation shielding potential. Besides that, the double-layer PDMS- based composite also has a potential to be used as shielding coatings to increase the radiation absorption and optimise patient's output in medical applications such as in medical imaging and in radiotherapy. The results provide significant benefits to humanity and are aligned with MySTIE (Medicine and Healthcare) as well as Sustainable Development Goal 3 (SDG 3) of Good Health and Wellbeing.

Keywords: lead replacement material, metal polymer composite, layering technique fabrication, composite surface morphology.

Tin-PDMS Composite: Innovative Structure as A Shield Against Ionizing Radiation

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PURPOSE: This study assesses the structural and potential radiation absorption properties of the composites fabricated from tin powder and polydimethylsiloxane (PDMS) liquid.

METHODS: A tin-PDMS composite is prepared by mixing PDMS with 20% tin powder and allowing for solidification at different temperatures (25 °C, 100 °C and 125 °C). The structural analysis is performed using Field Emission Scanning Electron Microscopy with Energy Dispersive X-ray spectroscopy (FESEM-EDX).

RESULTS: Tin-PDMS composites for each curing process demonstrate uniform and homogenous dispersion of tin powder. High porosity can be observed in the sample cured at room temperature, with porosity decreasing in the order of room temperature > 125 °C > 100°C. Regarding the weight percentage of oxygen content, it decreases in the following order: room temperature > 125 °C > 100 °C.

CONCLUSION: Tin-PDMS composites cured at 100 °C can potentially replace lead-based shielding, offering effective protection for healthcare workers and patients from unintended exposure to ionizing radiation.

Keywords: Metal and polymer composite, radiation characteristic, radiation shielding and photon ray

The Assessment of The Antibacterial Effect of Flaxseed-Coated Titanium Plates In-Vitro

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PURPOSE: To assess the antimicrobial activity of flaxseed-coated titanium specimen plates.

METHODS: The Ti plates were coated with flaxseed extract and tested in vitro using *S.aureus* and *P.gingivalis* cultured in nutrient agar. The pathogens were then inoculated in nutrient based broth and incubated for 24 hours.

RESULTS: Flaxseed-coated titanium efficacy was tested by measurement of the zone of inhibition. The result of the flaxseed-coated titanium was compared with positive control (broth) and negative control (ethanol). The antibacterial effect of flaxseed is comparable to the effect of ethanol and broth. The statistical analysis was done by using SPSS 25.

CONCLUSION: The results of the present study scientifically validate the inhibitory capacity of flaxseed against *S.aureus* and *P.gingivalis*, this will contribute towards the development of a new treatment option based on natural base products.

Keywords: Antibacterial activity; Flaxseed; Titanium plates; in vitro

Harmful Algal Bloom (Hab) Dispersal Simulation at Kerian Coastal Area, Perak

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Harmful Algal Blooms (HABs) have caused massive blooms at Kerian coastal waters. Among areas affected by HAB were Kualau Kurau, Kuala Gula and Tg Piandang. HAB species identified were Tripos furca, Margelifidenium polykrikoides, M. fulvescens and Noctiluca scintillans. The loss of fish recorded in a single event due to HAB reached a total value of RM11 million. Therefore, this study was conducted to determine the extent of HAB dispersal in this area during different monsoon seasons. To achieve the objective, bathymetry was determined, three simulations were carried out for hydrodynamic modelling and wave modelling to investigate hydraulic properties (tidal current, water level and current direction) and wave properties, during different monsoon seasons. HAB dispersal was simulated based on pre-reported location. Results indicate the extent dispersal of HAB is greater during certain monsoon and environmental conditions plays a crucial. Thus mitigation strategy such as early warning system on HAB occurrence is important to safeguard human health and decrease the loss to the fisheries productivity.

Keywords: Harmful Algal Bloom (HAB), modelling, MIKE 21, monsoon.

Enhancing Compressive Strength And Density Of Eco-Concrete Utilizing Alumina- Rich Cement, Slag, And Air Entrained Admixture

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This research introduces a new concept of concrete formulation that replaces the traditional Portland cement-based concrete with an innovative mix of alumina-rich cement, slag, and air-entrained admixtures. The focus is on achieving high compressive strength and density while maintaining environmental sustainability and a concrete pH value of less than 11. This study demonstrates how green concrete can meet ecological standards and performance expectations. By exploring various green concrete resources and incorporating diverse materials and additives, this work sheds light on future construction materials that are both stronger and more environmentally friendly. The methodology involves preparing concrete specimens with varying proportions of alumina-rich cement and slag, designing mixes, selecting appropriate materials, and conducting rigorous tests, including pH, compressive strength, and density tests. The study revealed that the SL30 (0.05) mixture, which includes 420g of slag and 3g of silicate, showed the highest performance with a compressive strength of 72.59 MPa, a density of 2176 kg/m^3, and a pH of 10.6 after 28 days. These findings highlight the potential of alumina-rich cement and slag in developing high-performance, eco-friendly concrete.

Keywords: Alumina-rich cement, slag, air-entrained admixtures, compressive strength, density, pH, green concrete, eco-friendly construction materials.

Mixed convection flow of nanofluid in channel affected by magnetic and Joule forces with a dimpled section and an adiabatic cylindrical obstacle

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PURPOSE: To derive mathematical models of convection flow which comprises continuity, momentum, energy, and mass equation. To obtain numerical solutions for each problem using automated solution technique. To analyze the flow and heat transfer characteristics for different values of the Joule heating parameter, Reynolds, Hartman, and Rayleigh numbers.

METHODS: The dimensional governing equations in vector form are transformed into non-dimensional form. Then, the dimensionless equations are solved numerically with finite element method (FEM) using automated solution technique which is FEniCS. The flow and heat transfer characteristics for different values of the Joule heating parameters are then analyzed.

RESULTS: The flow and heat transfer characteristics for different values of the Joule heating parameter, Reynolds, Hartman, and Rayleigh numbers.

CONCLUSION: This study shows that in convection flow applications, nanofluids perform much better than traditional fluids because of their increased heat transfer coefficients and thermal conductivity. These results open the door for further developments and demonstrate the potential of nanofluids to transform heat transfer technology.

Keywords: Buongiorno, nanofluid, cavity, FEM, FEniC

The Function And Capability Of Emergency Response Team In Emergency Preparedness And Response Plan For The Campus Environment

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PURPOSE: The aims are to emphasise ERT's role and responsibility in managing emergencies within their capacity.

METHODS: The study conducted a comprehensive literature search using Google Scholar to find articles, journals, and research papers to do a literature review. This literature review analyses ERT's functions and capabilities within sustainability campuses. The literature review study employed analytical reviews of relevant articles. The taxonomical table method was used to summarise findings, which allowed categorising and synthesizing information from various journals, articles and research papers.

RESULTS: The content analysis scrutinizes the literature review presented in the articles. As an organizational recommendation, ERT needs to emphasise its role in managing emergencies within ERT's capacity to handle them. The ERT's active involvement in emergencies is evaluated through establishing the ERT in the organization, procedures, and documentation.

CONCLUSION: The paper of the study illustrates the pivotal role of the ERT functions and capabilities in addressing emergencies on campus, safeguarding environmental well-being, and promoting resilience.

Keywords: Emergency Response Team (ERT), Emergency Management System (EMT), Emergency Preparedness Response Plan (EPRP), Campus Environment (CE),

Factors of Employee Engagement in Workspaces of Physical Office Environment (POE)

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PURPOSE: This paper explores the intricate relationship between employee engagement and workspaces in the physical office environment (POE). Workspaces refer to designated areas or environments, either physical or digital, where individuals or teams perform their tasks and activities. Traditionally, workspaces are physical offices or workstations equipped with the necessary tools and resources. They are characterized by individual enclosed spaces posited to influence employee behaviour, motivation, and overall engagement levels. This paper aims to examine how the POE contributes to influences from employee engagement.

METHOD: This paper employs analytical reviews of the related articles, selected from Google Scholar, to justify the influences of the physical office environment on employees' engagement in the workspaces. A content analysis is used to analyse the literature framework of the article, where the taxonomical table method is applied to systematically categorize, organise and interpret the findings.

RESULTS: The findings revealed the significance of the physical office environment on employees who are well-equipped with positive environment support, who will be highly satisfied and show a high level of commitment towards the organization. Creating a physical office environment that mirrors an organization's ethos and meets its employees' diverse needs is fundamental to fostering a vibrant and productive workplace.

CONCLUSION: In conclusion, the study confirms that the POE is a strategic asset that significantly shapes the attitudes and behaviours of employees, instilling a sense of belonging and motivation. When employees feel supported by their physical surroundings, they are more likely to be engaged, committed, and aligned with the organization's goals. In essence, the physical office environment is not just a backdrop but a strategic asset that can significantly influence the engagement and success of an organization.

Keywords: Employee engagement, workspaces, physical office environment

Behavioral Effects in Knowledge and Awareness Attribute for the Green Campus Management (GCM)

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PURPOSE: The primary objectives of the studies are to assess the influence of Green Human Resource Management (GHRM) practices on environmental knowledge and behaviors within university settings and to investigate the mediating role of environmental attitudes and intentions in translating environmental knowledge into pro-environmental behaviors.

METHODS: Most of the articles review adopts a mixed-methods approach, combining quantitative surveys and qualitative interviews to explore the behavioral effects of knowledge and awareness attributes in GCM. The survey instrument assesses participants' levels of knowledge, awareness, attitudes, and behaviors related to sustainability on campus, while semi-structured interviews provide deeper insights into the underlying factors influencing individual behaviors

RESULTS: Green Human Resource Management (GHRM): Few studies found that GHRM practices significantly enhance organizational citizenship behavior towards the environment and improve environmental performance. GHRM practices also positively influence the green behavior of academic staff through increased environmental knowledge. Environmental Knowledge and Pro-Environmental Behaviors: A study demonstrated that environmental knowledge impacts pro-environmental behaviors through the mediation of environmental attitudes and behavioral intentions. Similarly, another study found that environmental knowledge and personal norms positively affect waste management behaviors among university students. Green Campus Initiatives: Few studies highlighted that successful green campus initiatives promote sustainability awareness and engagement among students, contributing to the achievement of sustainable development goals (SDGs). Positive student perceptions and increased engagement were noted as key outcomes. Challenges in Sustainability Actions: A study identified factors leading to unsuccessful sustainability actions, such as lack of planning, insufficient funding, and poor stakeholder engagement.

CONCLUSION: The synthesis of these studies underscores the significant role of environmental knowledge and awareness in fostering pro-environmental behaviors within the context of Green Campus Management. Effective GHRM practices, coupled with targeted sustainability initiatives, can enhance environmental knowledge and positively influence behaviors among university staff and students. However, successful implementation of GCM requires careful planning, adequate resources, and active stakeholder engagement.

Keywords: Behavioral Effect, Knowledge, Awareness, Attribute, Green Campus Management

Exploring Course Assessment: Developing a Predictive Model for Student Performance Using Multiple Linear Regression

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PURPOSE: The objective of this study is to identify the significant assessments in the Mathematics I course and develop a student performance prediction model using multiple linear regression.

METHODS: The variables under consideration were the final examination score as a dependent variable and the assessment of tutorials, quizzes and open book tests were independent variables. The data were collected from 880 physical and biological module program students enrolled in the Centre for Foundation Studies, IIUM cohort of 2023/2024.

RESULTS: The study found that assessments in Mathematics I course significantly contribute to students' final examination scores, with an adjusted R-squared of 0.4411, indicating that 44% of the variability in final examination scores can be explained by the combination of tutorial, quiz, and open book test scores. For every 1% increase in tutorial scores, there is a 0.44% increase in the final examination score. Similarly, for every 1% increase in quiz scores, there is a 1.07% increase in the final examination score, and for every 1% increase in open book test scores, a 1.02% increase in the final examination score is observed.

CONCLUSION: The study concludes that assessments, including tutorials, quizzes, and open book tests are significant predictors of final examination scores in the Mathematics I course. These findings emphasize the significance of continuous assessment methods in enhancing students' academic performance and improving final examination scores.

Keywords: regression, performance, assessment

Integrating ConstructoPlay in Pre-University Education: Enhancing Planning Skills Through Construction Play

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PURPOSE: This study aims to investigate pre-university students' perceptions of ConstructoPlay's utilization in their curriculum.

METHODS: A questionnaire survey was conducted among students at the Centre for Foundation Studies, International Islamic University Malaysia, during the 2023-2024 academic year. Both qualitative and quantitative data were analyzed using descriptive analysis.

RESULTS: Results indicate that incorporating ConstructoPlay in pre-university programs significantly enhances students' comprehension of design planning concepts, problem- solving abilities, and long-term knowledge retention.

CONCLUSION: These findings offer valuable insights for students, educators, curriculum developers, and policymakers, highlighting the potential of ConstructoPlay as an innovative educational tool for pre-university students to effectively learn and apply design planning principles.

Keywords: ConstructoPlay, Pre-university education, Design planning, Interactive learning, Problem-solving skills

Empowering Shariah-Compliant Human Milk Banks Addressing the Challenges

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PURPOSE: Human milk banks are essential for providing essential nutrients to infants, particularly those with health conditions. Nevertheless, establishing and operating such institutions in Malaysia presents substantial challenges, particularly in ensuring Shariah compliance. There is a necessity for a guideline to empower the development of Shariah-compliant human milk banks in Malaysian institutions, as there is currently only one operational human milk bank in the country, and concern regarding religious adherence may impede future establishments. The study aims to identify challenges to establishing and operating human milk banks among Muslims and determine the essential elements for human milk banks that adhere to Shariah compliance.

METHODS: This study employs a qualitative approach, beginning with content analysis of 62 existing literature to identify challenges, followed by standard human milk guidelines used worldwide to determine the essential elements for human milk banks to adhere to Shariah compliance.

RESULTS: Religious concerns, cultural attitudes, and logistical issues were all identified as important challenges. The findings explore the essential elements (i.e., donor selection, milk collection, milk storage, and milk feeding) for Shariah-compliant human milk banks to address specific stakeholder needs and concerns.

CONCLUSION: This study provides a guideline to mitigate challenges, assure the long-term functioning of Shariah-compliant human milk banks, and promote the health and well-being of Malaysian infants

Keywords: Challenges, Human Milk Banks, Shariah Compliance, Guidance, Breast Milk

Enhancing Waqf Sustainability: The Critical Role of Stakeholder Identification and Engagement

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PURPOSE: This study aims to identify waqf stakeholder and understand their salience to improve engagement with them and thus achieve better sustainability outcomes.

METHODS: Using qualitative methods, particularly semi-structured interviews with key stakeholders such as State Islamic Religious Councils, Islamic financial institutions, waqf partners, and corporate waqf entities. The study conducts a thematic analysis to identify key themes that align with stakeholder salience.

RESULTS: The study found that the sustainability of waqf resources critically depends on fourteen key stakeholders. These stakeholders include the management team and committee, government authorities, State Islamic Religious Councils (SIRCs), the Fatwa Committee, higher authorities, waqifs, beneficiaries, the private sector, agents and subsidiaries, nazir khas, corporate waqf, NGOs, social influencers, academics, and international waqf organisations. The stakeholder mapping revealed that definitive stakeholders, such as the management team and committee, government, and SIRCs, hold significant power in directing waqf activities. These stakeholders align with the objectives of the beneficiaries, as the primary goal of waqf is to benefit them. Beneficiaries have been identified in this study as dynamic stakeholders due to their ability to shape the objectives of waqf.

CONCLUSION: This research comprehensively analyses which stakeholders have influences on waqf sustainability. It offers practical recommendations for fostering more effective stakeholder engagement in waqf, ensuring the long-term sustainability and impact of waqf institutions, and supporting the development of resilient waqf systems capable of addressing contemporary social and economic challenges.

Keywords: Stakeholder Salience, Sustainability, Waqf

Enhancing the Estate Administration through Mediation in the Estate Distribution Division

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PURPOSE: This paper explores the integration of mediation into the said agency as a strategic tool to streamline estate administration and resolve conflicts.

METHODS: Applying a comprehensive library-based research methodology, this study reviews existing literature, legal frameworks, and case studies to evaluate the impact of mediation on estate administration through a proposed practice of mediation.

RESULTS: Findings suggest that mediation offers a viable alternative to traditional litigation, providing a more amicable, cost-effective, and timely resolution to conflicts. The study highlights successful implementations of mediation in comparable jurisdictions, underscoring its potential benefits in reducing court caseloads and fostering harmonious settlements. Additionally, the paper proposes the creation of a mediation process flowchart to guide estate administrators and legal professionals in effectively implementing mediation.

CONCLUSION: By integrating mediation into the estate administration process, the Estate Distribution Division can enhance its operational efficiency, ensuring fair and expeditious distribution of assets. The proposed flowchart is expected to give a clear formulation of the mediation process, ultimately promoting a more effective estate administration system in Malaysia.

Keywords: Mediation, Estate Distribution Division, Family Disputes, Inheritance, Beneficiaries

iConsult; A Remote Monitoring System on students' learning satisfaction: A Case Study on students with special needs (SEN).

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PURPOSE: This study evaluates the learning experience of special needs students using an iConsuLt prototype that incorporates inclusive technology features in the system.

METHODS: An iConsuLt prototype that combines a distinctive chat interface with specific capabilities intended to assist users with visual difficulties and neurodiverse conditions was developed. The iConsuLt prototype test had three special needs students and a special needs trainer. Ten interview questions that were developed based on ADDIE Model were then given to the participants. The interview was transcribed, and thematic analysis was carried out.

RESULTS: Thematic analysis identified usefulness as the main theme, with 'retaining information' being the most appreciated features of iConsuLt prototype. Participants expressed satisfaction with the prototype's ability to retain and present information in a better way that matches their difficulties. Inclusivity is another feature reported. Participants believe that the combination of accessibility- focused design and neurodiversity- friendly tools displayed by iConsuLt prototype includes them in learning more.

CONCLUSION: It is critical in education to identify and meet the unmet needs of special needs students. The main components of inclusive technology that help students with special needs learn are highlighted in this study. The developed iConsuLt prototype showed an improved e-learning experience for the participants.

Keywords: Special needs, Learning experience, Inclusive technology, ADDIE Model.

A Deep Learning Method to Segment the Temporomandibular Joint (TMJ) Anatomy from Magnetic Resonance Imaging (MRI)

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PURPOSE: This study aims to create a fully automated artificial intelligence (AI) model using transfer learning methodology to detect and segment the condylar structure of TMJ.

METHODS: The model was trained using data taken from 260 patients using sagittal T1WI head MRI from Sultan Ahmad Shah Medical Centre (SASMEC). The training dataset was annotated manually using web-based platform, makesense.ai. In this study, we are using the Mask R-CNN framework to delineate mandibular condyle in MRI images automatically. The developed automated AI model was tested at different IoU thresholds to evaluate the performance of the model used.

RESULTS: Total of 359 sagittal MRI slices were used in this research. The model developed from Mask R- CNN framework with a ResNet-50 FPN backbone performed well in object detection and segmentation the mandibular condyle with a high precision of 81.09% on IoU threshold of 0.50.

CONCLUSION: This study demonstrates that AI, by using machine learning algorithms, can be a tool to assist clinicians and students to identify basic anatomical structures of TMJ. This study can lead to fully automated diagnosis of temporomandibular joint diseases in the future.

Keywords: Artificial intelligence, temporomandibular joint (TMJ) anatomy, magnetic resonance imaging (MRI), deep learning algorithm, segmentation

Antitumorigenic Action of Goniothalamus umbrosus in Oral Squamous Cell Carcinoma and Human Gingival Fibroblast Cell lines

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PURPOSE: This study aimed to evaluate the antitumorigenic action of G. umbrosus on oral squamous cell carcinoma (HSC3) and human gingival fibroblast (HGF) cell lines through its cytotoxic activity and expression of pro and anti-apoptosis genes.

METHODS: Leaves of G.umbrosus were extracted by macerating in hexane and further dried with a rotary evaporator. Cytotoxic activity of G.umbrosus extract was evaluated on HSC3 and HGF cell lines by MTT assay. Expression of Bax and Bcl-2 genes were evaluated by qPCR.

RESULTS: Hexane extract of G.umbrosus demonstrated moderate cytotoxic activity on HSC3 with IC50 value of 176 µg/ml and weak cytotoxicity on HGF with IC50 value of 343.5 µg/ml. G.umbrosus initiated apoptosis by downregulation of Bcl-2 gene by 14% and upregulation of Bax gene by 1.68 fold in HSC3 cell line.

CONCLUSION: Hexane extract of G.umbrosus exhibits anti-carcinogenic action through moderate cytotoxicity on HSC3 cell lines, weak cytotoxicity on HGF cell lines and the regulation of Bcl-2 and Bax genes. This study provided a theoretical reference for the exploration of potential anti-carcinogenic agents and may be useful for the design of potent adjuvant chemotherapeutic drugs.

Keywords: Goniothalamus umbrosus; oral cancer; human gingival fibroblast; cytotoxicity; gene expression.

Antibiotic Irrigation – A Minimally Invasive and Cosmetically Preferred Treatment for Huge Facial Carbuncle

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PURPOSE: This case report aims to present a minimally invasive technique in managing a huge facial carbuncle via antibiotic irrigation with concurrent systemic antibiotic.

METHODS: Gentamicin solution irrigation (80 milligrams in 500 milliliters normal saline) three times daily for four days and followed by once daily regime for three days was performed for a 51-year-old diabetic patient who presented with 8 x 8 cm right facial swelling with overlying erythema and discharging punctum. Judicious debridement of the swelling's necrotic center, systemic antibiotic and tight glycaemic control was concurrently instituted for the best clinical outcome.

RESULTS: Gentamicin solution irrigation showed favourable clinical and cosmesis outcome in our patient for his huge facial carbuncle. He only required 7 days of hospital stay and did not require further surgical intervention to clean or close the wound.

CONCLUSION: For the management of huge facial carbuncle, especially in patients with high anaesthetic risks, we proposed this minimally invasive treatment method via antibiotic irrigation. It shortens hospital stay, reduces risks of general anaesthesia, allows more skin preservation, and ultimately shows superior cosmesis outcome compared to conventional surgical methods.

Keywords: facial carbuncle, antibiotic irrigation, gentamicin

Episiotomy: A Scoping Review

Fatema Islam

PURPOSE: This scoping review aims to investigate the prevalence of episiotomy, socio-demographic characteristics of mothers, contributory factors influencing episiotomy performance, and immediate complication rates among women undergoing normal vaginal delivery.

METHODS: Using PubMed and ResearchGate, I carried out a thorough literature search that yielded 429 articles and 1516 journals at first. Following a title and abstract review, 158 of these publications were chosen for full-text assessment.

RESULTS: Of the evaluated articles, 40 met the inclusion criteria and were included in the analysis. Findings indicate the prevalence of episiotomy among the mothers having normal vaginal delivery revealing insights into maternal demographic characteristics, contributory factors influencing episiotomy performance, and immediate complication rates, ultimately informing evidence-based childbirth practices and improving maternal health outcomes for public health interventions.

CONCLUSION: Episiotomy prevalence significantly impacts the health management of primipara and multipara mothers with normal vaginal delivery indicating potential overuse compared to global standards. The results after analyzing the contributory factors and post delivery complications underscore the need for targeted interventions to improve the maternal healthcare outcomes in the region that can inform future research and public health programs.

Keywords: Episiotomy, contributory factors, post-delivery complications, socio-demographic characteristics, evidence-based childbirth practice, public health interventions.

The Effectiveness of Core Stability Exercises on Non-Specific Low Back Pain: A Systematic Review

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PURPOSE: This study reviewed the current evidence on the effectiveness of core stability exercises specifically for individuals suffering from back pain by examining various experimental studies, to assess the impact of core strengthening on pain relief and functional improvements.

METHODS: A systematic search of electronic databases (PubMed, science direct and Pedro) was conducted to identify experimental studies, that investigated the effect of core stability exercises on back pain and functional independence among patients with nonspecific back pain. Pedro scale was used to assess the methodological quality of the included articles.

RESULTS: Of the 350 studies identified, Titles and abstracts of 228 recorded studies were reviewed and 122 studies were excluded. Out of 106 articles, 101 full text articles were retrieved and assessed and evaluated according to inclusion and exclusion criteria. 20 studies met the criteria included in qualitative synthesis. The findings from these studies indicate that core stability exercises significantly reduce pain intensity and enhance functional outcomes in patients with non-specific low back pain.

CONCLUSION: This systematic review highlights the effectiveness of core stability exercises in managing non-specific low back pain. The results provide robust evidence supporting the incorporation of these exercises into treatment protocols for back pain, emphasizing the need for personalized exercise programs.

Keywords: Core stabilization exercises, Nonspecific low back pain, Disability

Porphyromonas Gingivalis In Oral Geriatrics And Its Association with Periodontal Health and Comorbidities

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PURPOSE: This study evaluated the periodontal status in geriatric subjects and found a significant association between P. gingivalis infection and clinical periodontal parameters as well as medical illness.

METHODS: Dental pockets' samples were obtained from 32 geriatrics who were chosen randomly from health clinics. Clinical periodontal parameters and medical illnesses were recorded during the oral examination. Samples were subjected to DNA extraction and polymerase chain reaction (PCR) amplification. The identification of P. gingivalis by PCR assay was determined based on the P. gingivalis 16S rRNA subunit amplification.

RESULTS: Approximately 90.63% of geriatric patients had periodontitis. The presence of P. gingivalis was significantly associated with periodontal depth and clinical attachment loss (P = 0.037). The extension of periodontal disease, smoking status, diabetes status and mild cognitive impairment are highly associated with P. gingivalis.

CONCLUSION: Due to asymptomatic periodontal disease in the early phase, early screening of bacterial detection and oral public health awareness is crucial, especially among elderly groups who are smokers and diabetics. Adequate oral care and comorbidities control among geriatrics are indeed crucial to prevent the periodontal disease progression.

Keywords: Porphyromonas gingivalis, periodontitis, geriatrics, smoker, mild cognitive impairment.

Evaluating Muscle and Physical-related Outcomes in Critical Care Nutrition: A Scoping Review

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PURPOSE: This scoping review aims to explore the tools available for the assessment of muscle and physical-related outcomes in association with nutrition dosage among the intensive care unit (ICU) patients.

METHODS: A comprehensive literature search was conducted using PubMed and Scopus databases, initially identifying 481 articles. These articles underwent a title and abstract review, resulting in 53 articles selected for full-text evaluation. Assessment tools for muscle and physical- related outcomes in studies of nutritional interventions were included.

RESULTS: Of the evaluated articles, 46 met the inclusion criteria and were included in the analysis. Findings indicated that the domains used in assessing the outcomes were diverse, ranging from muscle strength, muscle mass, physical function, and activities of daily living. The most frequently used tools included imaging techniques like muscle ultrasound and computed tomography (CT), as well as performance-based measures such as handgrip strength and the Medical Research Council (MRC)-sum score. The tools also varied in terms of comprehensiveness, precision, simplicity, and feasibility according to the number of muscle groups being examined, frequency of assessment, requirement of researchers' training, and number of resources needed. In most of the studies, measurements were repeated several times throughout the ICU stay until discharge to capture the association with nutritional intake. Nevertheless, some challenges to conduct complete assessments in the ICU were noted.

CONCLUSION: A range of physical functioning assessment tools utilized in ICU nutritional research has been identified from this review, highlighting the variability of choice that can be suited with researcher's objectives and availability of resources. To ensure consistency and result comparability, future research may focus on developing standardized protocols for selecting the tools.

Keywords: Critical care, functional outcomes, nutrition therapy, scoping review.

Comparative Evaluation of Dental and Cephalometric Skeletal Characteristics In The Sagittal And Vertical Plane.

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PURPOSE: This study aims to enumerate the prevalence of skeletal and dental classifications in a sample of Malay adult patients, and to determine the association between sagittal skeletal relationship, vertical facial dimension and anteroposterior molar relationship.

METHOD: A retrospective study involving orthodontic study models and lateral cephalograms of 117 Malay patients between 18 and 41 years old (mean age 26.5 ± 5.38) were evaluated for molar relationship (Class I, II or III), ANB angle (skeletal Class I, II or III) and maxillary-mandibular planes (MMP) angle (normo-, hypo- or hyperdivergent). Reassessment was done after two weeks for intra- and inter-examiner reliability. The association between these variables were analyzed with Chi-square test.

RESULTS: There was perfect agreement for intra- and inter-examiner reliability with kappa scored 1. A highly statistically significant association between molar relationship and sagittal skeletal pattern ($p=0.000$), and statistically significant association between sagittal and vertical skeletal pattern ($p=0.048$) was found. There was no significant association between molar relationship and vertical skeletal pattern ($p=0.855$).

CONCLUSION: Understanding these associations can aid orthodontists in accurate diagnosis and treatment planning, particularly when assessing skeletal and dental characteristics in the orthodontic practice.

Keywords: Cephalometry, Diagnosis, Molar Relationship, Sagittal plane, Vertical dimension

In Vitro Study on The Effectiveness and Durability of Three Desensitising Agents For Dentine Hypersensitivity Management

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PURPOSE: This study aims to evaluate the effectiveness and durability of desensitising agents for managing DH.

METHODS: Twelve non-carious extracted human permanent premolars were sectioned into the dentine layer. The dentine disc specimens were divided into four groups. Each group was applied with 8% arginine-calcium toothpaste, 0.24% sodium fluoride toothpaste, potassium nitrate toothpaste, and distilled water. A Scanning Electron Microscope (SEM) was used to evaluate the magnitude changes of dentinal tubules post-treatment with the desensitising toothpaste in terms of effectiveness and durability at day 1, week 1 and week 3 after application. Data were analysed using analysis of variance (ANOVA) with the Statistical Package for the Social Sciences (SPSS) software, version 27.0.

RESULTS: All toothpastes demonstrated significant dentinal tubule occlusions. Among them, the 8% arginine-calcium toothpaste showed the highest percentage of tubule occlusion on day 1, followed by potassium nitrate toothpaste and sodium fluoride toothpaste. After three weeks, the 8% arginine-calcium toothpaste continued to maintain the highest percentage of dentinal tubules occlusion.

CONCLUSION: The study revealed that 8% arginine-calcium toothpaste is the most effective and has longer durability among those tested groups. Therefore, this finding could help the patients in the selection of desensitising toothpaste in managing the DH.

Keywords: Dentine hypersensitivity, Desensitising agent, 8% Arginine-calcium, 0.24% Sodium fluoride, Potassium nitrate toothpaste

Quality Of Life of Adult Patient with Unilateral Hearing Loss: A Scoping Review

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PURPOSE: To determine the challenge and difficulty faced by patients with unilateral sensorineural hearing loss

METHODS: A search for articles was conducted using the defined selective keywords of quality of life in unilateral hearing loss in adults across 3 databases: Scopus, Embase, and PubMed, resulting in 876 articles. After removing 217 duplicate articles, screening based on the title and abstract concluded that 20 articles should be reviewed in full text.

RESULTS: Only 10 out of 20 articles can be retrieved. Out of these 10, 6 articles met the inclusion criteria. These articles indicate that patients experience difficulties in discriminating sound, localizing sound, emotional and social challenges, reduced enjoyment of music, and a lower overall quality of life.

CONCLUSION: The study focusing on the quality of life for adults with unilateral hearing loss is still limited. Adults with unilateral sensorineural hearing loss experience difficulties in communication, sound localization, and social-emotional challenges, necessitating proper audiological intervention and management.

Keywords: Quality of Life, Unilateral Hearing Loss, Challenge, Difficulty

Integration of Islamic Principles in Healthcare Delivery: A Narrative Review

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PURPOSE: The purpose of this review is to collate and analyse existing evidence pertinent to the implementation of Islamic principles within the healthcare delivery system.

METHODS: Literature was identified through relevance databases including IIUM Research Suppositories (IREP), Science Direct, Research Gate, SCOPUS, ProQuest, Emerald, PubMed and BMJ. Search terms included combinations of the following: Clinical, Shariah compliant, Muslim, Religion, Medical, Muslim friendly, Cultural competence, and Spiritual care with the use of Boolean operators "AND" and "OR". The search was limited to English, Malay, and Indonesian language articles. Each article was reviewed and the information from reviewed articles were included in this review.

RESULTS: The review has found that integrating Islamic principles into healthcare services is complex and influenced by various factors including understanding religious beliefs, adherence to Islamic teachings, and how cultural norms interact in healthcare. The three components related to Islamic healthcare services: are (a) global healthcare services management, (b) patients' satisfaction on service delivery, and (c) behavior of healthcare professionals.

CONCLUSION: There is still a gap and disparities in integrating Islamic principles into healthcare services. Further research on exploring integration of Islamic principles in healthcare services worldwide is recommended.

Keywords: Clinical; Shariah compliant; Muslim; Religion; Medical; Muslim friendly; Cultural competence; Spiritual care

A Conceptual Framework of Work-related Musculoskeletal Disorders (WMSDs) and Associated Risk Factors among Fishery Workers: A Narrative Review

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PURPOSE: This study addresses this gap by presenting a conceptual framework for understanding WMSD among fishery workers and identifying associated risk factors.

METHODS: A literature search was conducted on the Google Scholar database, focusing on peer-reviewed studies published between 2013 and 2023, as well as occupational health and safety (OSH) guidelines and WMSD-related reports. A narrative review of selected papers was done, leading to the integration of their findings and the subsequent development of a conceptual framework.

RESULTS: Based on current literature, ergonomic risk factors (ERFs) were significantly associated with the high prevalence of WMSDs among fishery workers, which could be confounded by various sociodemographic characteristics such as age and gender. The high exposure to ergonomic hazards among this population was mediated by poor working conditions while performing work activities. As evident in other industries, the ERFs could be moderated by implementing suitable ergonomic risk control measures (ERCM).

CONCLUSION: Since the present literature lacks information to support this hypothesis, there is an urgent need to explore and validate the role of ERCM in mitigating the ERF in the fishery before establishing practical WMSD interventions for this working population.

Keywords: Conceptual framework, Work-related Musculoskeletal Disorders (WMSDs), Risk Factors, Fishermen, Ergonomics

Determinants and Coping Strategies of Food Insecurity Among Non-Communicable Disease (NCD) Patients

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PURPOSE: This literature review aims to explore the determinants of food insecurity among NCD patients. Besides, the strategies on how they cope with it were also being investigated.

METHODS: A literature search was conducted on peer-reviewed journals using databases such as PubMed and Scopus. The inclusion criteria include studies involving NCD patients, published between 2010 and 2024, and published in English.

RESULTS: Findings showed that food insecurity is prevalent among patients with lower incomes, poor nutrition literacy levels, and inadequate social support. Furthermore, those who are unemployed and have transportation difficulties are more likely to experience food insecurity. Receiving food assistance, relying on low-cost food to save money for medical supplies, and reducing food consumption by other family members are the coping strategies for food insecurity.

CONCLUSION: Food insecurity status among the disease population could be determined through sociodemographic and economic status as well as their accessibility to food. Understanding the determinants and coping strategies of food insecurity in this population is crucial for developing interventions to improve their health outcomes.

Keywords: coping strategies, determinants, food insecurity, non-communicable disease, NCD

Exploring The Diabetic Foot Protection Services in Primary Health Clinics in Kuantan, Malaysia: A Qualitative Study

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PURPOSE: This research aimed to explore the current workflow system for managing diabetic foot in primary care clinics in Kuantan.

METHODS: A purposive sample of 12 healthcare professionals was selected for this qualitative research project from four Kuantan primary health clinics with the greatest number of National Diabetes Registry-recorded patients. Semi-structured, focus group interviews were conducted via the online platform. Interviews were recorded and transcribed verbatim. The data collected was analysed via thematic analysis.

RESULTS: The study identified three themes: workflow, healthcare provider roles, and guideline implementation. Clinics lacked standardized workflows in terms of business hours, dedicated teams, and improper screening practices, often deviating from guidelines. Screening tools were outdated and not aligned with current guidelines. Guideline implementations appear lacking among healthcare providers mostly due to ignorance of the availability of the latest Clinical Practice Guideline (CPG).

CONCLUSION: Before the diabetic foot protection team can be successfully built, numerous obstacles must be overcome. A clear workflow algorithm that can be employed in clinic settings is one of the projects that can be established.

Keywords: diabetic foot, foot protection team, foot care services, primary healthcare clinics, Malaysia

Phytochemical Investigations and An In Vitro Antioxidant Potential of Mitragyna Speciosa Leaves Extracts

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PURPOSE: The objective was to evaluate the phytochemical components and antioxidant properties of kratom leaves extracts to understand its medicinal potential as an antioxidative agent.

METHODS: Five different extracts were prepared from dried powdered kratom leaves with different methanol-water ratio by maceration method (0%, 25%, 50%, 75% and 100%). Initially, the extracts were subjected to phytochemical screening both qualitatively and quantitatively (total phenolic and total flavonoid contents: TPC, TFC) as well as in vitro antioxidant tests (DPPH and FRAP). Q-ToF-LCMS analysis was carried out to identify the secondary metabolites of the most potent extract.

RESULTS: The qualitative tests revealed different phytoconstituents in the extracts. The quantitative and antioxidant tests, however, exhibited that 100% methanol extract (ME) had the highest activity; TPC (257.464 ± 1.319 mg equivalent gallic acid monohydrate/gm of extract), TFC (50.746 ± 0.240 mg equivalent quercetin dihydrate/gm of extract), DPPH (IC50 7.9423 ± 0.1216 µg/ml) and FRAP tests (2103.46 ± 5.67 mg equivalent ascorbic acid/ gm of extract). The Q-ToF-LCMS analysis of 100% methanol extract identified flavonoids as one of the major biologically active compounds present.

CONCLUSION: The outcomes of this study revealed a great potential of M. speciosa leaves extract to be used in the treatment of inflammation, infection, diabetes and cardiac diseases due to presence of flavonoids as antioxidants. Also, the results corroborated the ethnobotanical uses of the plant leaves.

Keywords: Mitragyna speciosa, antioxidants, total phenolic content, total flavonoid content, DPPH.

Islamic Eating Practices Towards Disease Prevention: A Comprehensive Systematic Review

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PURPOSE: This systematic literature review investigates the role of Islamic eating practices in disease prevention, focusing on the effects of Islamic fasting, the impacts of Islamic eating practices, and the integration of Islamic dietary principles with modern nutritional science.

METHODS: A systematic search was conducted across Scopus and Web of Science databases, utilising advanced search techniques, and following the PRISMA framework. A total of 22 articles published between 2020 and 2024 were identified for inclusion.

RESULTS: Numerical results reveal diverse physiological effects of Islamic fasting, including improvements in metabolic health, cardiovascular function, and immune response. Psychological and behavioural impacts such as increased mindfulness, improved self- control, and enhanced spiritual well-being are also discussed. Furthermore, the integration of Islamic dietary principles with modern nutritional science highlights the alignment between Quranic teachings and contemporary nutritional recommendations.

CONCLUSION: This review underscores the multifaceted benefits of Islamic eating practices for disease prevention and emphasizes the need for further research to fully elucidate their mechanisms and potential applications in public health interventions.

Keywords: Islamic eating practices, disease prevention, holistic nutrition

Patin's Farm Water Quality and Its Impact on Antioxidant Status of Patin

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PURPOSE: This study aimed to investigate the antioxidant status of patin raised in river water of different pollution levels.

METHODS: Patin were purchased directly at patin's farm in Terengganu and Pahang. The water pH at each patin's farm was directly measured at the site. The fish's flesh and liver were sampled for the analysis of the antioxidant status. The total antioxidant assay was done to measure the antioxidant level of patin. Additionally, the TBARS assay was also conducted to measure the MDA level as marker of oxidative stress. The data were analyzed using the independent t-test and 95% confidence interval ($p < 0.05$) was taken as significant value.

RESULTS: The results showed that the patin's farm in Terengganu river had significantly lower pH as compared to the patin's farm in Pahang river. Additionally, the MDA concentration for both the muscle and liver of patin from Terengganu River were found to be significantly higher than the patin from Pahang river ($p < 0.05$). In contrast, there is no statistically significant difference in total antioxidant content between patin from both rivers.

CONCLUSION: In summary, the findings suggested that patin's farm in Terengganu was more polluted as compared to the patin's farm in Pahang as indicated by the pH level. This could lead to higher oxidative stress level in patin. Further study needed to be done in order to assess how these factors might affect patin's nutrient quality.

The Effect of Citrus Limon and Cananga Odorata Essential Oils on NOTCH1 Signalling in Normal Skin and Skin Cancer Cells

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PURPOSE: The aim is to investigate the antiproliferative effects of CL and CO EO on skin cancer cells via NOTCH1 gene expression and protein secretion.

METHODS: A431 (human squamous carcinoma) cell lines were treated with DMSO-dissolved cisplatin, and 125, 250 and 500 µg/ml CL or CO EO for 24 hours. The morphology of the cells was recorded under 20–40x magnification. Quantitative Real-Time Polymerase Chain Reaction (qRT-PCR) and western blot were performed from isolated mRNA and protein extraction from conditioned media respectively.

RESULTS: The cells showed similar morphology after treatment with cisplatin and 125 µg/ml CL and CO EO. NOTCH1 gene expression was downregulated among cells supplemented with 125 µg/ml CO EO as compared to those treated with cisplatin. Whereas the expression was upregulated among cells treated with 125 µg/ml CL EO. Meanwhile, protein secretion from treated A431 cells revealed upregulation of NOTCH1 at higher concentrations of EOs.

CONCLUSION: Although there are no remarkable morphological changes among treated cells, it shows a promising antiproliferative effect of CO EO than cisplatin and CL EO towards cancer cells molecularly. Possible crosstalk from skin cancer cells to their surroundings needs further study to determine the outcome of this cell signalling.

Keywords: Citrus limon, Cananga odorata, essential oil, skin cancer, NOTCH1

Mechanistic Insights into The Anti-Cariogenic Properties of Theaflavins Against Streptococcus Mutans: In silico

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PURPOSE: This study aims to investigate the antibacterial mechanisms of theaflavins against *S. mutans* using *in-silico* methods.

METHODS: PyRx version 0.8 was used to evaluate the binding affinities of four selected theaflavins (TF1, TF2a, TF2b, and TF3), against seven *S. mutans* proteins (PDB 4TQX: Sortase A, PDB 6CAM: Glucan binding protein, PDB 3QE5: Cell surface protein, PDB 3VX4: Quorum sensing, PDB 3AIC: Glucosyltransferase, PDB 2W3Z: Immune evasion, PDB 3CZC: Carbohydrate uptake). All the ligands were prepared and optimized using Avogadro-1.2 prior to the molecular docking. The Biovia Discovery visualizer was used to observe protein-ligand interactions.

RESULTS: TF3 generally demonstrates the strongest binding affinity across most proteins, particularly against glucan binding protein and glucosyltransferase.

CONCLUSION: Findings indicated that these theaflavins exhibit significant binding affinities to various *S. mutans* proteins, specifically TF3, suggesting their potential as anti-caries agents for therapeutic applications.

Keywords: Theaflavins, Early childhood caries, Anti-cariogenic, *Streptococcus mutans,* Molecular docking

The Effectiveness of Cord Technique Versus Laser System for Hemostasis and Periodontal Health: A Systematic Review

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PURPOSE: The study aim is to systematically review articles to evaluate the effectiveness of retraction cord versus laser system in achieving haemostasis and effects on periodontal health. In addition, patient and operator experience as secondary outcome.

METHODS: An electronic database search was conducted using four databases (PubMed, Google Scholar, Scopus and WOS) ranging from 2014-2024.

RESULTS: Eight potential studies were analysed by our inclusion and exclusion criteria which includes only clinical trials and comparative studies. 7/8 studies mentioned haemostasis control in retraction cord and laser systems. Periodontal health was assessed in 3/8 studies, measuring PD, PI & GI. Lastly, 5/8 articles mentioned regarding patient and operators view towards retraction cord and laser system. Bias assessment revealed five studies of lower risk of bias, two medium risk and one high risk bias.

CONCLUSION: This article supports the laser system has better haemostasis and periodontal health compared to retraction cord. Due to its heterogeneity outcomes across these studies, more standardised outcomes of future randomised control studies should be done.

Keywords: Gingiva, Retraction cord, Laser system, Haemostasis, Troughing

Extraosseous TC-99mbMdp Uptake Masquerading As Bone Metastasis

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This case report describes a 34-year-old female patient from Sultan Ahmad Shah Medical Center @IIUM, diagnosed with nasopharyngeal carcinoma (NPC) in March 2021. PET scan in July 2023 showed recurrent metastases to left humerus, right head of femur, left ischium, and with left popliteal node. Following radiation therapy, a bone scintigraphy was conducted to reassess potential bone metastasis. The scan revealed increased radiotracer uptake at the proximal right femur and left distal humerus, suggestive of metastasis. Additionally, there was unexpected symmetrical increased uptake at the bilateral maxillary sinus walls, an uncommon finding in standard bone scintigraphy. Further clinical evaluation and imaging, including SPECT and HRCT Temporal, revealed pansinusitis and right otomastoiditis. A swab culture confirmed the presence of Staphylococcus aureus, leading to antibiotic treatment. The increased radiotracer uptake was attributed to the mucoperiosteal reaction from chronic sinusitis, which stimulates osteoblastic activity and increased blood flow in the surrounding bones, mimicking metastatic disease. This case highlights the diagnostic challenge of distinguishing between infection and metastasis in bone scintigraphy and underscores the importance of thorough patient history and complementary imaging modalities for accurate diagnosis.

Keywords: Extraosseous TC-99m MDP uptake, bone metastasis, bone scintigraphy,

The Impact of Learning Rate in Enhancing Pneumonia Image Classification By Different Deep Learning Models

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PURPOSE: This research aims to study the relation between learning rate tuning strategies and classification accuracy for pneumonia imaging.

METHODS: Three different learning strategies including fixed learning rate, cyclic learning rate, and ReduceLROnPlateau learning rate are employed in 5 different deep neural network models. Two of the models are custom models, Convolutional Neural Network (CNN) and Feature Pyramid Network (FPN), while the remaining models are transfer learning models with DenseNet121, MobileNetV2, and ResNet50 as their base models. The Chest X-ray dataset used contains 5,856 chest X-ray images that are divided into 3 categories, normal lungs, bacterial pneumonia, and viral pneumonia.

RESULTS: Our result shows that the combination of MobileNetV2 with fixed learning rate achieved the highest score on every metrics tested with 76.4% accuracy, 0.869 precision, 0.761 recall, and 0.812 f1-score when evaluated on 624 test images. Standard deviation for each model across the learning rate tuning strategies is also the lowest at 0.007 for MobileNetV2, indicating that it performs well regardless of learning rate tuning mechanism used.

CONCLUSION: The novelty of this research is that it shows the critical impact of learning rate and strategy selection in optimising deep learning applications for medical imaging, offering new insights for future research in medical image classification systems.

Keywords: learning rate, pneumonia, transfer learning

Characterization and Stability of Optimized Lignocaine-Adrenaline Nanogel by Central Composite Design for Gingival Retraction Cord Utilization

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PURPOSE: This study aims to characterise and evaluate the stability of an optimised lignocaine-adrenaline nanogel using central composite design (CCD).

METHODS: Compatibility assessed by attenuated total reflectance-Fourier transform infrared (ATR-FTIR) and ultraviolet-visible (UV-Vis) spectroscopy. 18 lignocaine-adrenaline nanoemulsions (LANEs) derived via CCD were characterised by zeta potential, polydispersity index (PdI), pH and particle size. All LANEs were transformed into nanoemulsion-based gels (NBG) by incorporating 0.1% Carbopol940. Stability studies for LANE and NBG were conducted over 12 months at 25°C. The stability data for LANE and NBG were integrated with CCD predictions to produce the optimised NBG. The optimised NBG validated in triplicate and underwent 5000 rpm centrifugation for 30 minutes, freeze-thaw cycles at -5°C and 25°C, and repeated thermocycling at 4°C and 40°C.

RESULTS: ATR-FTIR and UV-Vis confirmed compatibility between lignocaine-adrenaline and excipients. The nanogel exhibited a viscosity comparable to ferric sulphate 24±1mPa.s at 20°C. Post-stability assessment, LANEs and NBGs showed no phase separation. The optimised LANE exhibited a zeta potential of -26.47±0.02mV, PdI of 0.36±0.01, pH of 6.28±0.02, and particle size of 61.76±0.25nm. The optimised NBG demonstrated stability under stress conditions.

CONCLUSION: The application of CCD facilitated the development of an optimised and stable NBG, which holds potential for enhancing the effectiveness of retraction cord application in restorative dentistry.

Keywords: lignocaine, adrenaline, nanogel, central composite design, gingival retraction cord

Challenges Of Total Hip Arthroplasty in Femoral Neck Fracture Over Residual Limb of A Trans-Tibial Amputee: A Case Report

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CASE: Lower extremity amputees are subjected to increased physical demands. The occurrence of neck of femur fracture in this group of patients is a catastrophe for the patient physiologically, psychologically and surgically challenging. Although the general surgical techniques are similar as with the non-amputee THA, specific considerations to preserve hip abductors integrity have to be taken into account such as type of surgical approach to the hip, global femoral offset length in order to achieve good postoperative functional outcome.

PURPOSE: This case report focuses to highlight specific considerations in achieving good postoperative functional outcome in Total Hip Arthroplasty in treating neck of femur fracture amongst below-knee amputees.

METHODS: Surgical approach utilized was the posterior approach to the hip of Southern and Moore. Secondly, longer femoral offset through femoral stem lateralization and the usage of larger femoral head reduces the force required for hip abductor to function. Functional outcome measured by using Lower extremity functional score (LEFS) and modified Harris Hip score at 6 months post op.

RESULTS: The LEFS score for the patient was 64 and modified Harris Hip score was 80, denoting good postoperative functional outcome.

CONCLUSION: THA of ipsilateral neck of femur fracture among amputees is a challenge. Although the surgical technique is generally like that in patients without amputation, considerations to preserve the abductors integrity and function are crucial for good postoperative rehabilitation and functional outcome.

Keywords: trans-tibial amputee, THA, hip, femur , fracture.

Post-Operative Behavioural Treatment Model: A Qualitative Study of the Preventive Measures to Reduce the Risks of Occupational Hazards among Dental Practitioners.

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PURPOSE: This study aimed to develop a post-operative behavioural treatment model (BTM: Post-Op) designed to prevent back pain and eye strain among dental practitioners, drawing from the perspectives of dental specialist, orthopaedic specialists, and optometrists.

METHODS: A qualitative research approach was adopted using purposive sampling. Focus group discussions (FGDs) were conducted separately among dental specialists, orthopaedic specialists, and optometrists to gather the expert views on effective strategies to reduce back pain and eye strain in dental practice. The FGDs were audio recorded and transcribed. The data were analysed using the framework analysis method to develop a comprehensive BTM: Post-Op.

RESULTS: The framework analysis identified four main themes that form the foundation of the post-operative measures recommended for dental practitioners. These measures include regularly performing muscle and back relief exercises; practicing eye relief therapy by applying an ocular lubricant and performing 21 forceful eye blinking; engaging in routine physical exercises to maintain muscle strength and flexibility; and application of heat relief therapies.

CONCLUSION: The BTM: Post-Op is systematically developed, with key themes organised to effectively address the occupational risks of back pain and eye strain among dental practitioners. This model offers practical, evidence-based strategies that can be incorporated into daily routines to enhance occupational health and safety in the dental profession.

Keywords: Prevention, back pain, eye strain, dental practitioners, occupational hazards. (Total: 249 words)

Development And Validation of An Instruments to Assess The Impact Of COVID-19 Towards Psychological And Fearfulness

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PURPOSE: To develop and validate an instrument to assess the impact of COVID-19 on psychological well-being and the fearfulness associated with the virus.

METHOD: The instruments were developed through a literature review and validated by a prospective and cross-sectional study using various methods of validation and reliability tests.

RESULT: The content validity of the instrument for assessing the impact of COVID-19 on psychology comprised 10 items with an S-CVI of 1.0. The instrument for assessing fearfulness of COVID-19 comprised 14 items with an S-CVI of 1.0. Face validity was used to determine the appropriateness of the instrument's content. For the 'Impact' construct, readability was rated at 93.7%, feasibility at 91.7%, clarity of words at 92.1%, and layout and style at 92.2%. For the 'Fearfulness' construct, readability was 93.0%, feasibility was 96.0%, and clarity of words and layout was 90.0%. The findings demonstrate high internal consistency for both the 'Impact' construct (Cronbach's alpha = 0.81) and the 'Fearfulness' construct (Cronbach alpha = 0.92). A moderate to strong positive correlation was found between the test and retest, with a coefficient of correlation (rho) of 0.728. Confirmatory factor analysis (CFA) was performed: 'Impact' construct (factor loading:>0.60, RMSEA:0.066, CFI:0.91, TLI:0.903, Chisq/diff:2.528) and 'Fearfulness' construct (factor loading:>0.60, RMSEA:0.071, CFI:0.965, TLI:0.958, Chisq/diff:2.545).

CONCLUSION: The instrument is a valid and reliable tool for assessing the impact of COVID-19 and the fearfulness associated with it. These instruments can be used to assess an individual's thoughts and perceptions regarding their psychological well-being and fearfulness about COVID-19.

Keywords: Instruments; Impact of COVID-19; mental health; psychological; fearfulness

Custom GPT MQA Advisor for Academic Accreditation: Innovation at the Kulliyyah of Medicine

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PURPOSE: The objective of this study is to develop the CustomGPT MQA Advisor, an innovative AI-powered system designed to streamline the accreditation process in higher education institutions. The system aims to provide precise guidance on Malaysian Qualifications Agency (MQA) standards and Malaysian Medical Council (MMC) requirements, addressing the complexities involved in academic accreditation.

METHOD: The CustomGPT MQA Advisor uses the advanced GPT-4 framework and employs natural language processing (NLP) techniques to comprehend and analyse extensive MQA and MMC documentation. It offers an interactive platform where users can receive contextual advice similar to conversing with a human expert. The stateful memory of the system ensures smooth and consistent interactions by customizing advice based on the history and specific needs of the institution. By referencing specific sections of official documents, the advisor provides actionable recommendations that are both reliable and verifiable.

RESULTS: The CustomGPT MQA Advisor effectively bridges the gap between complex policy language and practical application, significantly streamlining the accreditation process. It can be updated with the latest policy changes, ensuring users remain compliant with current standards. With its user-friendly interface and comprehensive report generation capabilities, the system makes it accessible to all users, regardless of their familiarity with accreditation policies. The Academic Quality Assurance Liaison (AQAL) of the Kulliyyah of Medicine has actively used the advisor, demonstrating its practical value in preparing submissions for full accreditation and curriculum reviews.

CONCLUSION: The CustomGPT MQA Advisor represents a significant leap in academic accreditation, enhancing the quality and efficiency of the process. The system offers precise, real-time guidance, aiding in meeting accreditation standards while also fostering a deeper understanding of quality assurance in higher education. This ultimately enhances the quality of education through informed decision-making.

Keywords: AI, accreditation, higher education, MQA standards, MMC requirements

The Impact of Tualang Honey on Liver Weight, Adipose Tissue, and Obesity Index in High Cholesterol Diet-induced Obese Rats

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PURPOSE: This research aimed to investigate the effect of Tualang honey (TH) supplementation on the liver and adipose tissue weight and to evaluate the Lee Obesity Index (LOI) in 12% high cholesterol diet (HCD) induced obese rats.

METHODS: Forty male Sprague-Dawley rats were assigned to 5 groups; Group 1 (normal diet), Group 2 (normal diet and TH 3.0g/kg), Group 3 (12% HCD), Group 4 (12% HCD and TH 3.0 g/kg) and Group 5 (12% HCD and Orlistat 10 mg/kg). They were given their diet for 12 weeks followed by treatment for 6 weeks. Their body weight and length were measured once weekly. At the end of the study, the liver and adipose tissue were harvested and weighed.

RESULTS: There was a significantly lower liver weight of Group 4 compared to Group 3 (19.05 ± 1.34 g vs 27.41 ± 1.71 g, $p < 0.001$). In normal diet groups, Group 2, have significantly lower liver weight compared to Group 1 (15.46 ± 1.50 g vs 20.53 ± 1.08 g, $p < 0.001$). Supplementation of TH also significantly reduced the accumulation of adipose tissue in Group 4 compared to Group 3 (11.09 ± 1.74 g vs 19.82 ± 2.22 g, $p < 0.001$). LOI in Group 4 is significantly lower compared to Group 3 (302.75 ± 8.21 vs 335.25 ± 11.27, $p < 0.001$) and there is no significant difference in LOI between Group 4 with Group 5 (302.75 ± 8.21 vs 308.38 ± 7.37, $p > 0.05$).

CONCLUSION: TH supplementation has been shown to reduce the liver and adipose tissue weight and improve the LOI in the 12% HCD-induced obese rats.

Keywords: Obesity, Tualang honey, High cholesterol diet, Lee's Obesity Index, Liver and adipose tissue

Liver Activity on Bone Scan in Metastatic Evaluation of Prostate Cancer- An Unusual Scenario

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Bone scans, commonly used to detect bone metastases in prostate carcinoma can sometimes show atypical uptake in non-bone tissues like the liver, posing diagnostic challenges. This case report describes a 66-year-old male patient from Urology Department of Hospital Tengku Ampuan Afzan (HTAA), who presented with lower urinary tract symptoms and an elevated PSA level of 40.3 μg/L, leading to the diagnosis of prostate adenocarcinoma (Gleason score 4 + 3 = 7, ISUP). Despite no clinical signs of liver dysfunction, unremarkable physical and blood examinations, his bone scan revealed unexpected diffuse liver activity. A contrast-enhanced CT scan identified a benign liver cyst, ruling it out as the cause of the abnormal uptake. As there were no identifiable precipitating factors, the diffuse liver uptake was concluded to be non-specific. The case highlights the importance of considering non-specific extraosseous localization of bone-seeking radiopharmaceuticals, as it can impact patient management and follow-up.

Keywords: bone scan, liver activity

Anterior Chest Swelling: Rare Extrapulmonary Tuberculosis Involving the Breast And Chest Wall

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Tuberculosis is an infectious disease caused by Mycobacterium tuberculosis bacillus, and more frequently a disease of pulmonary parenchyma. Extra pulmonary tuberculosis accounts for 10%-14% of all cases of tuberculosis and musculoskeletal tuberculosis forms 10-25% of these cases, which mainly involves the spine or weight- bearing joints. Amongst the skeletal structures, sternal involvement accounts for only 1-2% of all bone and joint tuberculosis. Breast tuberculosis is another rare form of extrapulmonary tuberculosis, which accounts for less than 0.1 % of all breast pathologies.

We report a case of 50-year-old female who was diagnosed with extrapulmonary tuberculosis involving the sternum and right breast. She was presented with central chest swelling for 1 month, but no constitutional symptoms. Examination revealed central anterior chest swelling, mobile and hard in consistency. Ultrasound breast and CT thorax showed multifocal right breast and central chest wall collections with sternal bone destruction. Percutaneous biopsy of anterior chest wall swelling showed granulomatous inflammation and special stain to look for acid fast bacilli and fungal bodies were negative. However, aspiration of pus from the chest wall collection showed AFB smear positive, and Mycobacterium TB quantiferon was also positive. She completed 2 months intensive phase of TB treatment with AKURIT-4 and 9 months maintenance phase of AKURIT-2. She responded well to treatment.

Chest wall and breast tuberculosis are rare entities and require a comprehensive diagnostic approach that involves clinical evaluation, radiological examination, and histopathological and microbiological sampling to confirm the diagnosis. High index of suspicion is crucial to facilitate early diagnosis and prompt treatment to prevent complications.

Keywords: Extrapulmonary tuberculosis, breast tuberculosis, sternal tuberculosis.

Sex prediction potential of occlusal morphological characteristics of maxillary posterior teeth in Pakistani population

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PURPOSE: To determine the sexual dimorphism and sex prediction potential of cusp number (CN), groove pattern (GP), and OP (occlusal pattern) of maxillary posterior teeth in Pakistani population.

METHODS: Right-sided maxillary first premolar (PM1), second premolar (PM2) and first molar (M1) of 130 dental casts were selected. Inclusion criteria was Pakistani Punjabi origin, completely erupted healthy teeth, and teeth with clearly demarcated GP. Exclusion criteria was maxillary anterior teeth, 2nd and 3rd molars, tooth with any anomaly or trauma obscuring the tooth occlusal morphology, restored tooth, damaged casts and any distorted digital cast. Images of occlusal surfaces of the selected teeth were captured using digital camera (Canon) and the images were saved as Jpeg. files. The CN, GP and OP were recorded for each tooth type. Data were analysed using Chi-square test and binary logistic regression.

RESULTS: The GP and OP of PM1, and M1, while the CN of M1 showed significant difference between males and females ($p < 0.05$). Sex prediction accuracy was 76.7% for training samples and 70% for the test samples.

CONCLUSION: Occlusal characteristics of maxillary posterior teeth in Pakistani population exhibit significant sexual dimorphism and sex prediction potential, thus may be used for sex determination along with other procedures in forensic investigations.

Keywords: Occlusal characteristics, maxillary teeth, sexual dimorphism, sex prediction, dental profiling

Characterization and Analysis of Fiber for Dental Application

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PURPOSE: This research aims to overcome these shortcomings by incorporating natural fiber into dental composites to reinforce their structural integrity. The primary objective is to assess the mechanical properties of pineapple leaf fiber as a reinforcing agent in dental restorative composites.

METHODS: This involves conducting comprehensive sample preparation of PALF-reinforced composite, material characterization, chemical composition analysis, mechanical tensile testing, crystallographic analysis using X-ray Diffraction, and surface moisture evaluation through the use of contact angle analysis to determine the efficacy of the composite system.

RESULTS: Anticipated outcomes include the development of robust and durable restorative materials with enhanced mechanical properties. The significance of this output is two-fold: it contributes to reducing negative impact on environment by utilizing discarded pineapple waste, at the same time advancing the dental engineering practices by offering socio-economic benefits by providing longer-lasting, cost-effective dental restorations, thereby potentially reducing the need for frequent replacements and associated healthcare costs.

CONCLUSION: This research project holds promise in revolutionizing restorative dentistry by introducing sustainable and efficient dental materials, ultimately benefiting both patients and healthcare systems as well as the environment for sustainable agriculture.

Keywords: dental restorative, natural fiber, PALF, polymer composite fabrication

Atypical Features of Mixed Epithelial And Stromal Tumour Of Kidney: A Case Report With Histopathology Correlation

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Adult cystic nephroma and mixed epithelial stromal tumours (MEST) are classified under the mixed epithelial and stromal tumour (MEST) family, which is a part of the 2016 WHO renal tumour classification. They are rare, benign tumours which have similar imaging appearance as certain types of renal carcinoma. Hence, it is often regarded as malignant pre-operatively and histopathologically confirmed to be benign.

We present a case of a 66-year-old lady who presented with gradual abdominal distension for 9 months, associated with loss of appetite, loss of weight and early satiety. Other than clinical findings that point towards ascites, the rest of her physical examination was unremarkable. Blood investigations including tumour markers were normal. Ultrasound and CT showed a huge unilocular intra-abdominal cystic mass with enhancing solid component attached to the right kidney and exerting significant mass effect to the surrounding structures. The patient developed impending abdominal compartment syndrome and underwent right nephrectomy with tumour excision. The final histopathological diagnosis revealed mixed epithelial and stromal tumour (MEST). The patient recovered well.

Mixed epithelial stromal tumours (MEST) are rare clinical entity. Ultrasound and CT scan are investigating modalities and histopathological correlation is needed to reach the diagnosis. This case has an unusual and different radiological imaging appearance when compared to past literature and contributes an additional case to our collective knowledge of these lesions.

Keywords: Cystic nephroma, mixed epithelial stromal tumour, renal carcinoma.

Spontaneous Epidural Hematoma in dengue fever – A case report.

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Introduction:

Dengue fever is most common arthropod-borne viral disease that is endemic in most tropical and subtropical regions around the world including Malaysia. Symptomatic dengue infection is characterized by dynamic clinical, haematological, and serological changes that evolve throughout the course of the disease [1]. Dengue fever is recognized for inducing a range of multisystemic complications, including bleeding tendencies, renal toxicity, heart failure, shock, disturbances in electrolyte balance.

However neurological manifestations such as headache, seizure, neck stiffness, drowsiness, depressed sensorium, behavioural disorders, delirium, cranial nerves paralysis and especially spinal cord involvement has been rarely reported [2]. We report a case of dengue infection complicated with spontaneous acute epidural hematoma secondary to thrombocytopenia. This case report details a compelling medical scenario involving a 62-year-old woman with underlying hyperlipidaemia who presented with a five-day history of dizziness, lethargy, and reduced oral intake. A thorough initial examination revealed bicytopenia, marked by a total white count of 3.5 x 10^9 and a platelet count of 5.0 x 10^9, alongside a normal haemoglobin level of 13.5 g/dL and a haematocrit level of 40%. Unremarkable results were obtained from additional laboratory investigations, including renal and liver function tests. The intrigue deepened when a Dengue combo test shows NS1 and IgG positivity, leading to her admission for observation and fluid maintenance. The patient was treated for Dengue fever on the fifth day of illness, in critical phase with warning sign characterised as haemoconcentration and thrombocytopenia.

Keywords: Dengue, Paraplegia, Spinal, Epidural Hemorrhage.

Minimum bactericidal and fungicidal activity of theobromine on Candida albicans and Streptococcus mutans

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PURPOSE: Theobromine is an active compound isolated from *Theobroma cacao* (cacao). Even though it is known to be safe, however, the efficacy in orthodontic applications has remained unknown. Thus, this study aims to determine the effect of theobromine on *C. albicans* and. *S. mutans* that are majorly isolated from white spot lesion.

METHOD: *C. albicans* (ATCC MYA-4901) and *S. mutans* (Ingbritt) were grown in yeast peptone dextrose (YPD) and brain heart infusion (BHI) broth, respectively, at 37°C for 24 h. The microorganism was then standardized at OD620nm 0.1, equivalent to 10^6 cells/mL and 10^7 cells/mL of *C. albicans* and *S. mutans*, respectively. A total of 60 µL of inoculum, 60 µL of 1 g/mL of theobromine, and 60 µL of broth were pipetted into the well, and 60 µL microorganism was inoculated to 96-well plate. The theobromine was subjected to serial dilution to give a total concentration of 50% (v/v), 25% (v/v), 12.5% (v/v) and 6.25% (v/v). Finally, the plate was incubated at 37°C for 24 h, and the OD was measured using a spectrophotometer.

RESULTS: The minimum inhibitory concentration of *C. albicans* and *S. mutans* towards theobromine was observed at 500 mg/mL for both microorganisms. Furthermore, the microorganisms were also found to be susceptible to CHX.

CONCLUSION: In conclusion, theobromine inhibited *C. albicans* and *S. mutans,* thus potentially be used for orthodontic application.

Keywords: Theobromine, minimum inhibitory concentration, orthodontics, Candida albicans, Streptococcus mutans

The expression of genetic biomarkers OPG, RANKL & PGE2 induced by orthodontic tooth movement: A Review

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PURPOSE: his study aims to to provide an overview of the available evidence regarding the expression of genetic biomarkers OPG, RANKL & PGE_2 induced by orthodontic tooth movement.

METHOD: A comprehensive literature review was conducted using databases such as PubMed, MEDLINE, Scopus, and Google Scholar. Studies published in English up to May 2024 were included. Keywords used for the search included "orthodontic tooth movement," "OPG," "RANKL," "PGE_2," and "genetic biomarkers." Studies were selected based on relevance, study design, and the availability of data on the expression of OPG, RANKL, and PGE_2 during OTM. A total of 46 studies were included in the review.

RESULTS: The literature suggests that the forces applied during OTM lead to the release of cytokines and growth factors, initiating bone remodelling. RANKL promotes osteoclast proliferation and bone resorption, while OPG inhibits RANKL's effects. Studies show increased bone resorptive mediators like RANKL and decreased OPG levels with orthodontic force. PGE_2 levels increase when an orthodontic force is applied and promote bone resorption.

CONCLUSION: Majority of the studies reviewed show a pattern in the expression of RANKL, OPG and PGE_2 in bone remodelling during OTM. Despite the general consensus, there are still inconsistencies in the results which indicates more high quality research in the area is recommended, especially in different stages of orthodontic treatment.

Keywords: Orthodontic tooth movement, genetic biomarkers, osteoprotegerin, RANKL, prostaglandin E_2

Effects Of Sugar-Free Chewing Gum in Patients Wearing Orthodontic Intermaxillary Elastic: A Preliminary Study

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PURPOSE: To investigate the effects of sugar-free chewing gum in minimizing orthodontic pain, use of analgesic medications, appliance breakages and elastic dislodgement associated with intermaxillary elastics wear.

METHODS: This was a randomized controlled trial with 1:1 allocation ratio. 28 patients were randomly allocated to sugar-free chewing gum (CG) and non-chewing gum (NG) groups. Patients in the CG were instructed to chew sugar-free gum for 5 minutes immediately after orthodontic intermaxillary elastics wear and then at 12-h intervals for 3 days. All patients were allowed to take analgesics. Pain score was recorded using a visual analogue scale at all eight time-points, including baseline score, along with any use of analgesics, appliance breakages and elastics dislodgement. Data were evaluated using independent t-test, Mann Whitney U test, one-way repeated measures ANOVA and Chi Square test.

RESULTS: The pain scores were significantly lower in the CG compared to the NG at 24, 48, 60, and 72 hours after elastic wear. Analysis using one-way repeated measures ANOVA showed that there were statistically significant differences in the grand mean pain scores between the two groups (p = 0.005), with the CG having significantly lower pain scores (1.50) compared to the NG (3.2). However, no significant differences were found between the groups across all the time intervals (p = 0.262). Furthermore, no significant associations were observed between the groups regarding analgesic uptake, appliance breakages, and elastic dislodgement.

CONCLUSION: The use of sugar-free chewing gum may reduce orthodontic pain associated with intermaxillary elastics wear and no evidence that chewing gum increased the incidence of appliance breakages and elastic dislodgement.

Keywords: Orthodontics, Pain, Chewing gum

Unravelling the Integration of Islamic Principles in the Clinical Practices: Study on Orthopaedic Doctors Consultation, Decision Making and Holistic Care in the Sharia -compliant Hospital.

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PURPOSE: This study aims to explore and discover the perspectives and applications of Islamic medical practice among medical doctors in a Sharia-compliant hospital.

METHODS: A disciplinary category case study design with a qualitative approach was employed. Between June 2023 and March 2024, 20 healthcare professionals—Orthopaedics doctors—who were directly involved in patient care in the wards, clinics, and operation theatre of the Sultan Ahmad Shah Medical Center's (SASMEC) Department of Orthopaedics took part in in-depth semi-structured interviews. In addition, other data was gathered through non-participatory observation of wards, operational theatre, and clinic consultations. An analysis of SASMEC's circulars and guidelines on IMP was also included in this study. NVivo 14 software was used to save and categorize the data. Framework analysis was used in the means of data analysis.

RESULTS: Three major themes can be inferred from the analytical results which are the practice of Islamic values among healthcare professionals, characteristics of Islamic healthcare professionals, and sustaining Islamic medical practice. It can be said that the perspectives of medical doctors related to IMP are well understood among them regarding its concepts and applications. Alas, the practice is not as much as their understanding. Furthermore, even though the document related to the IMP was available, not much was used for the practice by the physicians.

CONCLUSION: The idea of Sharia-compliant healthcare provides holistic care where the pivotal role is the medical doctor. Hence, medical doctors must have the expected quality in entertaining the purpose of holistic care that consists of physical, mental, social, and spiritual aspects. The findings generated from this study can chart the trajectory of how IMP can be improvised in a Sharia-compliant hospital in Malaysia through framework and guideline development.

Keywords: Islamic medical practice, Shariah-compliant hospital, Healthcare professionals, Clinical Routine

The Speech Assessment of Electronic Hearing Protection Device

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PURPOSE: The Electronic Hearing Protection Device (e-HPD) has been widely introduced to workers to overcome the communication barrier and limitations of conventional hearing protection devices in the workplace. This highlights the need to evaluate the effectiveness of e-HPDs, especially in terms of speech enhancement performance.

METHODS: A study was conducted in a soundproof room to assess the speech enhancement of e-HPD using 50 subjects who have normal hearing and claimed to be fluent in Malay language. The e-HPD, which claimed to have speech enhancement, was utilized in this study with three modes of testing: unprotected, passive protection, and active protection. These were tested at two noise levels to ensure reliability and the pink noise was utilized to mimic the industrial noise. A one-way ANOVA was analysed using the Statistical Package for the Social Sciences (SPSS) software.

RESULTS: The one-way ANOVA showed significant differences of signal-to-noise ratio (SNR) among the three modes of testing ($p < 0.05$) at both 70 dBA and 80 dBA noise levels with the active mode showed the best SNR -14.4 and -16.0 respectively compared to other two modes that yielded SNR of -10.1 and -10.3 for unprotected mode as well as -9.0 and -8.0 for passive mode. The lowest the SNR the better the speech perception in noise.

CONCLUSION: The active mode of electronic hearing protection devices has a better capability in enhancing speech in noisy environments compared to unprotected and passive mode, thereby helping workers communicate more effectively. This feature can significantly improve safety and efficiency in various industrial and construction settings where background noise is prevalent

Keywords: electronic hearing protection device, speech enhancement, noise, worker

Identifying barriers and limitations of conventional vision problem screening methods in children: A scoping review

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PURPOSE: The aim of this scoping review is to identify barriers and limitations of conventional vision problem screening methods in children.

METHODS: Screening was done to ascertain study eligibility after a search strategy and keyword searches were developed. This included a scan of the abstract and title, followed by a full-text review. Articles that provided empirical investigations that analyzed and identified barriers and limitation to the conventional visual problem screening method were included.

RESULTS: Of the articles screened, 16 met the eligibility criteria of the review. These studies suggest common barriers to pediatric vision screening include lack of routine practice, varying guidelines, parental and system factors, financial and logistical issues, and children's behavioral challenges. In addition, limited resources, professional availability, and inadequate training are also a common limitation of conventional vision problem screening methods.

CONCLUSION: Several barriers to conventional vision screening methods in children were identified in this review. To ensure effective detection of vision problems at an early age, there is necessity for exploring easily accessible methods that can detect wide-ranging vision problems in children.

Keywords: barriers and limitations, convention vision problem screening, scoping review

Development Of an Integrated Tam And Khan Model On The Intention To Use Blended Learning In Malaysian Orthodontic Postgraduate Programme

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PURPOSE: This cross-sectional descriptive study aimed to develop an integrated theoretical model that can identify factors contributing to the intention to use blended learning in Malaysian orthodontic programmes.

METHODS: This study combined factors from acceptance models the Technology Acceptance Model (TAM), and KHAN model, as the foundation for the theoretical modelling. Twelve factors and hypotheses were identified from the integrated model. A questionnaire was distributed to respondents composed of students and academicians from four universities that offer orthodontic programmes. The online questionnaire was validated and had a total of 172 items based on a 5-point Likert scale to address the ranking of the identified factors.

RESULTS: Seventy-six respondents completed the questionnaire. Partial Least Squares Structural Equation Modelling analysis using SmartPLS software was utilised to validate the research model and the related factors. 9 out of 12 hypotheses were found to be significant and supported (weight>0.1 and t-value>1.65, p-value<0.001).

CONCLUSION: This study was able to develop and validate an integrated TAM and Khan theoretical model. The model identified 9 factors that determine the intention to use blended learning in Malaysian orthodontic programmes. These factors are important components to ensure the implementation of blended learning is perpetual.

Keywords: Blended learning, Orthodontics, TAM, Theoretical Model

Differences Of Blood Parameters Between HbE Thalassemia and Beta Traits and Its Prevalence of Malay Population In Malaysia

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PURPOSE: This study is conducted to determine the prevalence of individuals with HbE thalassemia and the prevalance of beta thalassemia minor individuals in Malaysia and to compare the red blood cells (RBC) parameters between individuals with HbE thalassemia with and beta thalassemia minor individuals.

METHODS: From October 2022 to October 2023, 526 healthy non-smoking Malays aged between 18 and 40 were screened for the presence of SeAO and other common haematological pathologies that could affect red blood cells parameters such as thalassemia and anaemia. Full blood picture (FBP) and haemoglobin analysis were taken.

RESULTS: We identified 30 (5.7%) individuals with HbE and Beta Thalassemia traits 10 (1.9%) . Among these 21 (77.8%) had isolated SeAO, 2 (7.4%) had concomitant thalassemia, 3 (11.1%) had concomitant anaemia, and 1 (3.7%) had both thalassemia and anaemia.

CONCLUSION: There were significant differences in the RBC counts, mean corpuscular haemoglobin (MCH), red cell distribution width (RDW) with p value <0.05. We have identified a few blood parameters that could potentially be used to differentiate between HbE Thalassemia and Beta Thalassemia Carrier.

Keywords: HbE Thalassemia, Beta Trait,

Development and Evaluation of a Nutritional Education Video on Healthy Weight Gain and Total Energy Intake during Pregnancy

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PURPOSE: By leveraging engaging and accessible video content, we aimed to develop an animated video to educate mothers about healthy weight gain and sufficient total energy intake during pregnancy, and evaluate it in terms of suitability, understandability, and actionability.

METHODS: The contents of the video were determined through a series of workshops. The video was created using an online video animation creator. Nutrition and dietetics experts assessed the video's suitability using the Suitability Assessment for Materials (SAM) tool. The video understandability and actionability assessments involved the same experts plus participants from the intended viewers' populations, which comprised of women who were pregnant or had been pregnant within the last 12 months. The Patient Education Materials Assessment Tool for Audiovisual (PEMAT-A/V) was utilised for these purposes.

RESULTS: The experts (n=6) rated the nutritional education video with 70% for its suitability, 80% for understandability, and 92% for actionability, which indicated a superior material rating. The video then underwent further improvements based on feedback from the experts. It then received much better feedback from the intended viewers (n=30) where the video received 92% for understandability and 93% for actionability.

CONCLUSION: The positive ratings from both experts and the intended audience in terms of suitability, understandability, and actionability reflect the newly developed education video's ability to deliver essential nutritional information on healthy weight gain and total energy intake during pregnancy.

Keywords: Pregnancy, Gestational weight gain, Total energy intake, nutrition education, Animated video

Family Caregivers' Unmet Needs When Caring for Older People in North-East Peninsular Malaysia

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PURPOSE: This study aims to examine the extent of unmet needs and identify the factors associated with unmet needs of family caregivers who are caring for older people in North-East Peninsular Malaysia.

METHODS: A cross-sectional study was conducted among 231 family caregivers of older people, conveniently selected from two districts in Kelantan. Participants completed a questionnaire composed of sociodemographic items and a modified comprehensive needs assessment tool for caregivers. Descriptive statistics were used to summarize the data in frequencies and percentages. Independent t-tests and one-way analysis of variance were used to examine correlations among variables.

RESULTS: Unmet needs were highest in the 'healthcare staff' domain, particularly the need for nurses to explain treatment or care being given to the patient. Statistically significant differences in unmet needs were observed concerning the years of caregiving, level of education, and household income (P < .05).

CONCLUSION: Recognizing and addressing the unmet needs of family members caring for older people is crucial for a holistic elder care strategy. The study highlights the importance of involving family caregivers in supporting older people. By prioritizing their needs and offering tailored support, healthcare providers can enhance outcomes for older people and improve overall family well-being.

Keywords: Family Caregivers, Older People, Needs, Unmet Needs, Malaysia

Prevalence and Associated Factors of Faecal Incontinence among Community- Dwelling Older Adults in Pahang, Malaysia

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PURPOSE: This study aims to investigate the prevalence of FI and identify associated factors among community-dwelling older people in Pahang.

METHODS: This study is a cross-sectional survey. Respondents were recruited from Senior Citizen's Activity Centres using simple random sampling. A set of questionnaires was completed using a guided self-completion method. Multiple logistic regression analysis was used to identify associated factors.

RESULTS: A total of 72 respondents were recruited with a mean age of 67.14 years (SD = 4.21). About 87.5% were Malay, and 59.7% were women. The prevalence of FI was 47.2%. Among those with FI, 67.6% reported a small amount of faecal leakage that stained their underwear, 26.5% had a moderate amount, and 5.9% reported a large amount of recurrent stool leakage. About 38.2% experienced leakage 2 to 3 days a month, and 35.3% experienced leakage 1 to 3 days a week. Loose or watery stool (OR = 4.21, 95% CI = 1.38, 12.81; P = 0.011) and lumpy or hard stool (OR = 6.00, 95% CI = 1.44, 25.0; P = 0.014) were significantly associated with FI.

CONCLUSION: This study reveals a high prevalence of FI among community-dwelling older people in Pahang, with both loose or watery stool and lumpy or hard stool significantly associated with FI. Targeted interventions and healthcare strategies are needed to manage and mitigate the burden of FI in this population.

Keywords: faecal incontinence, older people, diarrhoea, constipation, Malaysia

Can a single tooth be a reliable as reliable source for human identification?

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PURPOSE: To determine the uniqueness of the GP of maxillary first premolar (PM1), second premolar (PM2), and first molar (M1) using a two-dimensional (2D) Hirox KH-7700 stereomicroscope.

METHODS: Right-sided PM1, PM2, M1 of 90 dental casts were selected. Inclusion criteria completely erupted healthy teeth, and teeth with clearly demarcated GP. Exclusion criteria were maxillary anterior teeth, 2nd and 3rd molars, tooth with any anomaly or trauma obscuring the tooth occlusal morphology, restored tooth, damaged casts and any distorted digital cast. 2D images of the selected teeth were captured with Hirox KH-7700. The groove patterns were traced and then duplicated. The original and duplicate sets of images were decoded by examiner A. 90 matched and 90 non matched pairs of GP of PM1, PM2, and M1were made by examiner A and superimposed by examiner B using the Hirox software. The results were examined by examiner A to record the correct and incorrect decisions.

RESULTS: Examiner B gave the correct decision for all the pairs, and all tooth types showed 100% groove pattern uniqueness.

CONCLUSION: Maxillary PM1, PM2 and M1 exhibit uniqueness of groove pattern, thus may be used for human identification when other primary identifiers are unavailable.

Keywords: Tooth morphology, maxillary teeth, occlusal surface, individuality, human identification

Relationship of incidence of Radix Entomolaris and C-shaped canal on mandibular molars using CBCT: A multi-center study

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PURPOSE: This study aimed to explore the co-occurrence of RE and CSC on FM and SM, respectively, and their association with gender, race, and geographical location in Malaysian population.

METHODS: 1015 CBCT images of permanent mandibular molars from Malaysian patients were collected retrospectively from 7 dental schools in Peninsular Malaysia. The CBCT images were analysed by one researcher from each dental school, trained with CBCT technology. The presence and absence of RE and CSC on FM and SM respectively were scored as yes/no. Sociodemographic data were recorded.

RESULTS: The prevalence of FM with RE was 21.2% and SM with CSC was 37.9%. The co- occurrence of RE and CSC on the same quadrant was 6.5% (OR=1.497, p=0.014). Female, Chinese, and samples from Eastern of Peninsular Malaysia were associated with CSC on SM (p<0.05).

CONCLUSION: The increased appearance of CSC on SM when RE is present on FM makes it imperative for clinicians to be vigilant during examination and diagnosis to prevent potential endodontic mishaps. With improved understanding of root and canal anatomy, there will be increased awareness of potential challenges and limitations of root canal treatment procedures.

Keywords: anatomy, distolingual root, fused root, mandibular molars, race

Nasal Profile Differences Between Skeletal Class II and Class III in Malay Females

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PURPOSE: To compare the nasal profile differences between skeletal Class II and Class III Malay females.

METHODS: 30 pre-treatment lateral cephalograms of skeletal Class II and Class III female patients, aged 20-30 years old, were retrieved from IIUM Postgraduate Orthodontics Clinic. After calibration, the cephalograms were manually hand traced using a 0.05mm lead pencil on an acetate sheet on a light viewing box in a dark room. Five nasal parameters (nasomental, nasofrontal, nasofacial, nasolabial, and nasal bone angle) were measured using a protractor and metal ruler. The measurements were repeated after two weeks for intra-examiner reliability with intraclass correlation coefficient (ICC). Independent t-test was used to measure the differences between the groups.

RESULTS: The study found that the nasofrontal, nasofacial and nasolabial angles were significantly more obtuse in the skeletal Class II group (139.63±5.44º; 32.17±3.25º; 94.03±12.07º) compared to the skeletal Class III group (136.40±6.91º; 28.47±3.31º; 82.60±13.32º), with mean differences of 3.23º (p=0.049), 3.70º (p<0.001) and 11.43 º (p<0.001) respectively. Additionally, the nasomental angle was found to be larger in the skeletal Class III group (140.07±4.26º) as compared to the skeletal Class II group (129.83±5.59º), with a mean difference of 10.23º (p<0.001). However, no significant differences were found in the nasal bone angles between the groups.

CONCLUSION: The nose of skeletal Class II patients appears longer and more projected from the face as compared to skeletal Class III patients.

Keywords: Nasal, skeletal Class II, skeletal Class III, Nasal projection

Undergraduate Students' Knowledge and Perception Towards Dental Recall

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PURPOSE: To analyze the level of knowledge and perception of dental recall among IIUM undergraduate students attending IIUM Dental Clinic.

METHODS: Validated questionnaires were distributed to the participants. Descriptive statistics and Spearman's correlation test were used to analyze the data.

RESULTS: The response rate was 87%. More than 60% of the participants have poor knowledge regarding the dental recall's definition, and the treatment done during the visit. Participants believe that they only need to come for dental recall if they suffer from tooth and gum problems and have enough money and adequate time. The average level of knowledge and perception among the participants was 64.2% and 72.3%, respectively. Spearman's correlation test shows a correlation with moderate significance, $r = 0.136$, p-value < 0.05, between the level of knowledge and perception.

CONCLUSION: Participants show a moderate understanding and perception of dental recall. Dental students are more knowledgeable than students from other faculties. Most participants believe that dental recall is only important if they suffer from oral disorders, have enough money and time. The study demonstrates that there is a link between knowledge and perception of dental recall.

Keywords: Dental recall, Knowledge, Perception.

Understanding The Perception of Complementary and Alternative Medicine in Treating Orofacial Diseases Among the Orang Asli Community in Sungai Lembing, Kuantan

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PURPOSE: This study aimed to determine the prevalence of CAM usage within the community, identify the most common types of CAM treatments utilized, and investigate the perceptions and reasons behind their use of CAM. Also, to compare the community's preferences between CAM and conventional medicine for managing orofacial diseases.

METHODS: This cross-sectional study focused on the OA community residing in Sungai Lembing, Kuantan. The participants were selected through convenient sampling, and informed consent was obtained. The interviews were conducted in Malay using a structured, validated questionnaire. 42 participants were involved in the study. Descriptive analysis and Chi-square tests were performed to analyze the statistical significance of the data using SPSS version 25.0.

RESULTS: 42.9% of the OA used CAM for orofacial symptoms, 83.3% used herbs, and 22.2% consulted shamans. Dental pain (50%) and swollen gingiva (31%) were common symptoms. Most (88%) reported symptom relief from CAM, 5% experienced worsening, and 7% saw no change. Reasons for CAM use included symptom relief (29%), influence from friends and family (24%), lack of transport (24%), and logistic issues (19%). While 92% of Muslims preferred conventional dental treatment, only 64.7% of non-Muslims did, with 17.6% opting for a combination of methods. Religion significantly influenced treatment choice (p=0.047).

CONCLUSION: CAM usage is prevalent among the OA for orofacial symptoms, with religious beliefs significantly influencing their treatment preferences.

Keywords: Complementary and Alternative Medicine, Orang Asli, Orofacial disease

Family Caregiving Burden: Spiritual Well-Being and Resilience in Caring For Older People With Functional Deficits Among Felda Settlers In Kuantan, Pahang

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PURPOSE: This study aimed to identify the connection between caregiver sociodemographic characteristics, health status, caregiving demands, spiritual well-being, resilience, and caregiving burden in caring for older people with functional deficits in Felda Territory of Kuantan, Pahang.

METHODS: A cross-sectional study with cluster random sampling was conducted to select caregivers of older adults with functional deficits in Felda Territory, Kuantan, Pahang. Felda, a naturally occurring group, was randomly chosen from three populations representing the area. Self-administered questionnaires covering sociodemographic information, caregiving demands, JAREL Spiritual Well-being Scale, Connor-Davidson Resilience Scale (CD-RISC), and Zarit Burden Interview (ZBI) were distributed to residents via the Felda office. Data were analyzed using descriptive statistics and the Pearson Chi Square test in SPSS version 26.

RESULTS: The majority of participants were female caregivers, who experienced a higher caregiving burden than male caregivers. No significant associations were found between caregiver sociodemographics, caregiving demand, and caregiving burden. Caregiver spiritual well- being was not linked to caregiving burden, but caregiver resilience was significantly associated with a lower caregiving burden. Specifically, 4% of caregivers with low spiritual well-being and 1.6% with high resilience reported severe caregiving burden.

CONCLUSION: The findings suggest the need for further intervention in addressing the caregiving burden among caregivers in Malaysia.

Keywords: caregiving burden, caregiver spiritual well-being, caregiver resilience, older people with functional deficits

A Rare Case of Patella Sleeve Fracture Encountered in Hospital Port Dickson

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CASE: A 13-year-old boy presented with pain and swelling over his left knee and an inability to walk. The injury occurred during a football game when he attempted to kick a ball but fell with his knee in a flexed position.

Examination revealed mild knee swelling, inability to extend the knee, and tenderness at the inferior pole of the patella, along with a palpable gap. An X-ray of his left knee showed a small bone fragment avulsed from the inferior pole of the patella, patella alta, and a disrupted patella tendon shadow. Given the mechanism of injury and clinical examination, there was a high suspicion of a patella tendon rupture. However, an ultrasound confirmed the patella tendon was intact but showed fluid accumulation at the inferior pole of the patella, leading to a diagnosis of a patella sleeve fracture.

The patient underwent surgery, initially planned for screw fixation. However, a patella pull-through suture was performed instead due to the small and displaced fragment. The surgery was completed without complications.

PURPOSE: This case report aims to provide a detailed discussion on this rare and significant injury.

RESULTS: Postoperatively, the patient was placed in a cylinder cast. Follow-ups showed the fracture was well united, and the patient regained full knee extension.

CONCLUSION: Patella sleeve fractures are rare, accounting for less than 1% of pediatric fractures, often resulting from powerful quadriceps contractions applied to a flexed knee. Diagnosing this fracture can be challenging both clinically and radiographically, as initial X-rays may appear normal. Patella alta is a key diagnostic sign, and ultrasound is very helpful. Clinician awareness is crucial for accurate diagnosis and treatment.

Keywords: Paediatric, Patella sleeve fracture, rare condition