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EMERGING TRENDS
IN MEDICAL IMAGING:
FROM PATIENTS TO PIXELS
SYMPOSIUM

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**Emerging Trends in Medical Imaging:
From Patients to Pixels Symposium,
19 June 2025**

CONTENTS

Title	Page Number
EMERGING TRENDS IN MEDICAL IMAGING: FROM PATIENTS TO PIXELS SYMPOSIUM, 19 JUNE 2025	
ORAL PRESENTATIONS	1-10
e-POSTER PRESENTATIONS	11-15
ADDITIONAL ABSTRACTS	16-44

EMERGING TRENDS IN MEDICAL IMAGING: FROM PATIENTS TO PIXELS SYMPOSIUM, 19 JUNE 2025

ORAL PRESENTATIONS

Oral ID	Authors	Title	Page
ET004	Nurul Aqilah Murizam, Nurul Dizyana Nor Azman, Mohd Hafizi Mahmud	Identification of Gender in Adult Population Using Pelvic CT Morphometry Approach	1
ET011	Nabilah Ramli, Nurul Dizyana Nor Azman, Rafidah Supar	Knowledge and Practice of Radiation Protection Among Medical Professionals in Interventional Radiology at Private Hospitals in Ipoh	2
ET012	Nurul Atiqah binti Baharudin, Farah Wahida binti Ahmad Zaiki	The Efficacy of Personal Computer (PC) AI Image Enhancer Software on Low and High Contrast PA Chest Radiograph: An Experimental Study	3
ETJ001	Nor Aniza Azmi, Nur Amira Nadia Mohd Lotpi, Noor Shatirah Mohamad Fandi Voon, Rosnita Binti Ibrahim, Najihah Hamzaini	Pixels, Practice, and Policy: Assessing Radiation Therapists' Compliance with Malaysia's Allied Health Act 774	4
ETJ002	Norhayati Mohd Zain, Nur Anis Izzati Che Mut, Nur Dini Dalilah M Rosli, Adzmel Mahmud, Azlan Shah Nazruddin	Transforming Breast Health Education in a Society 5.0 Framework	5
ETJ004	Mohamad Hakim Suhaimi, Farah Wahida Ahmad Zaiki	Scattered Radiation Dose Mapping Using Personal Electronic Dosimeter in Mobile Fluoroscopy Imaging	6
ETJ006	Maheran Che Ha', Izdihar Kamal2, Khairil Amir Sayuti, Muhammad Khalis Abdul Karim	Influence of Subject Specific Factors on Myocardium Native Longitudinal Relaxation Time (T1) Values: A Retrospective Study	7

Oral ID	Authors	Title	Page
ETU001	Salsadila Cindy, Za'im Muhammad, Istiqomah Anisa Nur	Analysis of Dees Radius Changes to the Energy Produced by Cyclotron as a Proton Accelerator Using Python Programming	8
ETU005	Utami, Asih Puji, Astari, Fisnandya Meita, Dama, Felinda Astuti	The Differences Between BM3D and NLM Denoising Techniques to Improving Thoracic Image Information In Low Field MRI	9
ETC009	Mikaela M. Inciong, Cazandra M. Kate Luces, Cashmer R. Pantao	Effects of Ionizing Radiation on <i>Escherichia Coli (E. Coli)</i> Bacteria	10

EMERGING TRENDS IN MEDICAL IMAGING: FROM PATIENTS TO PIXELS SYMPOSIUM, 19 JUNE 2025

e-POSTER PRESENTATIONS

Poster ID	Authors	Title	Page
ET009	Noor Aina Dayana Noor Na'em, Nurul Dizyana Nor Azman, Mohd Hafizi Mahmud	Assessment of Image Quality Using Standard Contrast Injection and Weight- Based Contrast Injection Protocols in Coronary CT Angiography	11
ET013	Rubiah Mohd Khalil, Faikah Zakaria, Shahrani Janudin	Knowledge And Awareness of Magnetic Resonance Imaging Safety Among Healthcare Workers in a Single Medical Centre	12
ET014	Nurul Najwa Ahmad Khod, Ann Eryнна Lema Thomas Sudin, Khairunnisa Abd Manan	Awareness of Hospital-Acquired Infections and Hand Hygiene Practices Among Patients and Public Attendees at the Radiology Department	13
ETJ005	Mashitah Muhammad, Nur Hayati Jasmin	3D Cine for the Assessment of The Heart: A Systematic Literature Review	14
ETU011	Alfarizi Nursan Salman, Utami Asih Puji, Wati Retno	Analysis of Dose History And Health of Radiation Workers in Radiology Installation Of PKU Muhammadiyah Hospital Bantul and Panti Nugroho Hospital Sleman	15

EMERGING TRENDS IN MEDICAL IMAGING: FROM PATIENTS TO PIXELS SYMPOSIUM, 19 JUNE 2025

ADDITIONAL ABSTRACTS

Abstract ID	Authors	Title	Page
ET005	Nurul Wahidah Basakkri, Nur Azira Wahidah Yusri, Khairunnisa Abd Manan	Scattered Radiation and Exposure Dose Mapping of Micturating Cystourethrogram And Barium Swallow in the Fluoroscopy Room: A Phantom Study	16
ET015	Siti Nur Irdina Amalin Shahrul Nizam, Zafri Azran Abdul Majid, Abdul Halim Sapuan, Iqbal Jamaludin, Sayed Inayatullah Shah, Zulfaezal Che Azimin	Determination of Scattered Radiation on General X-Ray Tabletop Using Dose Mapping Technique	17
ETJ003	Md. Naeem Hossain Fakir, Md. Sagor Mahmud, Muhammad Safwan Ahmad Fadzil, Abdul Khaliq Mohd Saparudin, Norhafidzah Mohamed Sharif , Nur Farhana Ab Kadir	Quantitative Assessment of Entrance Surface Doses for Trauma Patients During Multifield Plain Radiography Procedures: A Phantom Study	18
ETU002	Nugroho Anshor, Mukmin Amril	Image Analysis of Radiographic Cranial Examinations Using Analog Grid and AI-Based Grid	19
ETU003	Nugroho Anshor, Syahara Listyawan, Heroe Boedi H, Dwi Setyo N	Uniform Whole Body Immobilization Device for Radiotherapy	20
ETU004	Takimpo Kalista, Istiqomah Anisa Nur, Budiyo Tris	BNO–IVP Examination Procedure with Clinical Ovarian Cyst	21
ETU009	Pakaya Savitri Andriani Sri, Astarti Meita Fisnandya	Apron Leak Testing Using Detectors in the Radiology Installation of The General Hospital Dr. Soehadi Prijonegoro Sragen	22

Abstract ID	Authors	Title	Page
ETU012	Purwitasari Iqna, Nugroho Anshor, Utami Asih Puji	Analysis of X-Ray Radiation Exposure Safety in the Radiology Installation of Panti Nugroho Hospital Sleman	23
ETU013	Ayunni Erlyana Eka Candra, Nurliscyaningsih Ike Ade, Istiqomah Anisa Nur	Comparative Analysis of Abdominal Image Information Using Physical Grid and Virtual Grid	24
ETU014	Fembli Mutiara, Mufida Widya, Liscyaningsih Ike Ade Nur	The Use of 3D Reconstruction in CT Scan Examination of Elbow Joint with Dislocation Cases at Surakarta Orthopedic Hospital	25
ETU019	Umi Uswatun Khasana, Ayu Mahanani	Thorax Radiography Examination Procedure in Dengue Haemorrhagic Fever (DHF) Cases at The Radiology Installation of Roemani Muhammadiyah Hospital Semarang	26
ETU020	Mufida Widya, Sari Aliya Ambar	Use of Pitch in Head CT Scans for Trauma Cases at Banyumas Regional General Hospital	27
ETC001	Kim Lyca Y. Lazarte, Chelsey Rizshel V. Pauli, Xaviera Vienne N. Rivera, Daniele Clyde P. Cacha	Patient's Perception of Radiation Safety Protocols in Radiation Therapy Facility in Batangas	28
ETC002	Vincent Emil M. Landicho, John Anthony Q. Seña, Daniele Clyde P. Cacha	Clinical Education Assessment of Radiologic Technology Interns of CEFI In Computed Tomography	29
ETC003	Schner A. Ingco, Ronagene T. San Juan, Daniele Clyde P. Cacha	Difficulties Encountered by Computed Tomography Scan Technologist in Handling Traumatic Brain Injury Patient	30

Abstract ID	Authors	Title	Page
ETC005	Sanndy T. Gallentes, Lloyd Francis E. Nera, King Justine Jose C. Reyes, Daniele Clyde P. Cacha	Exploring Glutinous Rice Flour as an Alternative to Ultrasound Gel: Efficacy, Safety, and Practicality	31
ETC006	Yogie G. Villamayor, Daniele Clyde P. Cacha	Empowering Communities: A Multifaceted Approach to Raising Awareness for Ionizing Radiation in Diagnostic Imaging	32
ETC007	Bernadette N. Maaño, Chrysta Red P. Paningbatan, James Ivanne D. Zaide, Daniele Clyde P. Cacha	Factors That Influence the Program Choice of Freshmen Students of the Bachelor of Science in Radiologic Technology: A Quantitative Study of Motivations	33
AD001	Muhammad Safwan Suile, Nurul Dizyana Nor Azman, Mohd Amirul Tajuddin	Knowledge And Awareness of Radiation Protection And Diagnostic Reference Level Among Radiographers In Western Coast Region Sabah Hospital	34
AD002	Soffea Qistina Mohd Yusoff, Rafidah Supar, Nurul Saadiah Shamsuddin	Diagnostic Reference Level (DRL) Of Cardiac Angiography: A Single Centre Study	35
AD003	Peggy Peturus, Sook Sam Leong, Nurul Saadiah Shamsuddin ¹	Accuracy Of Ibreast-Exam (IbE) In Detection of Breast Lesion	36
AD004	Norshuhada Sahnan, Faikah Zakaria, Khairunnisa Abd Manan	Comparative Evaluation of Computed Tomography Severity Score and Quantitative Computed Tomography in Covid-19 Pneumonia Assessment	37
AD005	Dunya Mohammad Salih, Faikah Zakaria, Farahnaz Ahmad Anwar Bashah	Evaluating Magnetic Resonance Imaging Sequences for The Detection of Multiple Sclerosis Lesions	38
AD006	Siti Nur Shuhadah Jafri and Nurul Dizyana Nor Azman	The Impact of Screen Time Usage Towards Academic Performance Among Medical Imaging Students in Public University	39
AD007	Shazana Mohd Fakharudin and Nurul Dizyana Nor Azman	Establishing Local Diagnostic Reference Level for Paediatric Fluoroscopic Examination in Micturating Cystourethrography	40
AD008	Nur Afiq Harun, Ann Erynna Lema Thomas Sudin	Evaluation Of Radiographers' Knowledge, Attitude and Practice (KAP) On the Radiation Protection During General Radiographic Procedures	41

AD009	Nur Amelia Syahida Abd Moin and Ann Eryнна Lema Thomas Sudin	Involvement and Perspectives on Research Activities Trend Among Radiographers at Tertiary Hospitals in Johor	42
AD010	Nor Shakilah Hamdan, Ann Eryнна Lema Thomas Sudin, Khairunnisa Abd Manan	Knowledge Of Nosocomial Infection and Practice of Infection Control Among Medical Imaging Students in Three Malaysian Public Universities During Their Clinical Practice	43
AD011	Nurul Balqis Khairulnizan, Mohd Hafizi Mahmud	Local Diagnostic Reference Levels for Paediatric CT Brain	44

EMERGING TRENDS IN MEDICAL IMAGING: FROM PATIENTS TO PIXELS SYMPOSIUM, 19 JUNE 2025

ORAL PRESENTATION

ET004

Identification of Gender in Adult Population Using Pelvic CT Morphometry Approach

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Introduction: Identification of gender is fundamental in forensic science, anthropology and medico-legal investigations. Among various anatomical structures, pelvis is widely recognized for its substantial sexual dimorphism. Anatomically, men and women have different pelvic characteristics of diameter size and pubic angle. Conventional measurement techniques such as calipers may have limitations that lead to lower reliability. This study aims to identify gender characteristics based on Computed Tomography (CT)-based pelvic bone morphometry. **Methods:** A total of 100 adult pelvic CT images (n=50 male, n= 50 female) aged from 18 to 78 years old were retrospectively reviewed from PACS of a health institution. Three morphometry parameters were quantified from each pelvic CT image of both male and female patients including pelvic inlet diameter, left innominate height, and subpubic angle using the volume rendering method. **Results:** Significant changes of morphometry parameters were demonstrated between male and female in pelvic inlet diameter (10.72 ± 0.79 cm vs 12.16 ± 0.78 cm), left innominate height (19.83 ± 0.88 cm vs 18.37 ± 0.94 cm) and subpubic angle (69.06 ± 7.90 vs 91.69 ± 26.10) with $p < 0.001$ for all parameters. **Conclusions:** The results reveal significant variation between males and females based on CT-based pelvic bone morphometry. Pelvic CT imaging is a feasible tool for gender identification in adult population. Gender identification is a crucial process for personal identification; hence this approach could be potentially useful in forensic science, anthropology and medico-legal investigations.

Keywords: adult, gender, morphometry, pelvic CT

ET011

Knowledge and Practice of Radiation Protection Among Medical Professionals in Interventional Radiology at Private Hospitals in Ipoh

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Introduction: The increasing use of interventional radiology (IR) procedures has raised concerns on radiation exposure awareness among medical professionals (MPs) in hospitals. The aim was to determine association between knowledge and practice score with MPs demographic data in IR procedures at private hospitals in Ipoh, Perak. **Methods:** A cross-sectional study was conducted in two private hospitals in Ipoh, Perak, involving 90 medical professionals including specialists, radiographers, and nurses. The questionnaire consists of three sections which are demographic, knowledge and practice of radiation protection and was shared online through Google Forms. Data were analysed using the Pearson chi-square test, with a significance level of $p < .05$. **Results:** The results indicated that statistically significant and strong association between knowledge and radiation training, $\chi^2 (2, N=90) 44.950, p < .001$ but not statistically significant between practice and radiation training, $\chi^2 (2, N=90) = 5.254, p = .072$. Level of education also shown statistically significant and strong association for knowledge $\chi^2 (2, N=90) 24.18, p < .001$ as well as practice, $\chi^2 (2, N=90) 30.49, p < .001$. **Conclusions:** These results show that participation in radiation training is factor to improve knowledge in radiation protection. Level education is also a contributing score for radiation protection where the entry level of education for radiographers and nurses is diploma while specialist is up to master's degree. This result emphasizes a need for regular radiation training for MPs to update and improve knowledge and application in any procedure involving ionising radiation.

Keywords: interventional radiology, medical professionals, radiation protection

ET012

The Efficacy of Personal Computer (PC) AI Image Enhancer Software on Low and High Contrast PA Chest Radiograph: An Experimental Study

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Introduction: Medical imaging is critical in modern healthcare because it provides diagnostic information about internal anatomical structures. Chest radiographs (CXR) are commonly used to assess thoracic anatomy, although visualisation issues continue, particularly in low-contrast CXRs. This study compares the effectiveness of various personal computer (PC) AI image enhancer software in visualising the anatomy of high and low-contrast PA CXRs. **Methods:** An experimental investigation was undertaken using five PC AI image enhancer programs to visualise the thoracic anatomy. Experts examined the radiographs using visual grading analysis (VGA), which involves visualising 16 common chest anatomical features. Nine radiological experts assessed the VGAs. The data was examined using SPSS version 20 and a non-parametric technique called the Wilcoxon Signed Rank technique. **Results:** High-contrast CXR improves anatomical visualisation significantly ($p < 0.05$), particularly in the hilum ($p = 0.03$), descending thoracic aorta ($p = 0.04$), and right heart border ($p = 0.05$). Significant improvements were observed in low-contrast CXR structures such as the carina ($p = 0.05$) and costophrenic angles ($p = 0.05$). **Conclusions:** The findings highlight the effectiveness of AI software deep learning in visualising anatomical elements in CXR. Future research should concentrate on improving AI algorithms for consistent performance across different X-ray examinations and studying radiological diagnostic acceptability. This work requires additional clinical testing on a population to determine the feasibility of transferring this preliminary study to a clinical environment of radiological image viewing.

Keywords: artificial intelligence, image enhancement, radiography

ETJ001

Pixels, Practice, and Policy: Assessing Radiation Therapists' Compliance with Malaysia's Allied Health Act 774

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Introduction: The Allied Health Professions Act 2016 (Act 774) was established to regulate allied health professions in Malaysia, including radiation therapists, with the aim of ensuring professional accountability, patient safety, and standardized practice. Despite its importance, the level of understanding and compliance among radiation therapists remains insufficiently understood. This study aimed to assess the knowledge, attitudes, and practices (KAP) of Malaysian radiation therapists regarding Act 774, and to identify factors influencing regulatory adherence. **Methods:** A cross-sectional quantitative survey was conducted among 164 registered radiation therapists across Malaysia using a validated KAP questionnaire. Descriptive statistics were used to evaluate levels of awareness, perception, and compliance. Inferential analysis explored associations between KAP domains and demographic variables. **Results:** While most respondents demonstrated basic awareness of Act 774, notable deficits were observed in specific areas such as the registration process, penalties for non-compliance, and perceived benefits of the Act. Attitude scores reflected a generally positive outlook, with a majority recognizing the Act's role in enhancing professional standards and patient safety. However, practice scores were relatively low, revealing a significant gap between attitude and behavioral compliance. Years of experience showed a significant association with practice levels. A moderate correlation between attitude and practice suggested the presence of external barriers, including limited institutional support and enforcement challenges. **Conclusions:** These findings highlight the need for targeted education, structured enforcement strategies, and policy enhancements to strengthen compliance with Act 774. Bridging the gap between regulation and practice is critical for elevating radiation therapy standards in Malaysia.

Keywords: radiation therapy practice, Act 774, clinical compliance, professional regulation, workforce education

ETJ002

Transforming Breast Health Education in a Society 5.0 Framework

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Introduction: Breast health literacy, encompassing awareness of risk factors, symptom recognition, and proficiency in self-examination, is crucial for women to adopt proactive health practices that improve outcomes. Recently, digital health tools have gained prominence as innovative means to enhance health knowledge and empower individuals in managing their well-being. The Breast Imaging Education Bot (BieBot©) is an interactive chatbot created to provide detailed educational content on breast health, with a focus on breast cancer and its screening techniques. The development of BieBot© as a conversational platform reflects a progressive strategy aligned with Society 5.0 principles within healthcare. Utilizing advanced chatbot technology, this project aims to empower women by delivering accessible, trustworthy information about breast cancer and examination procedures. **Methods:** BieBot© supports both Malay and English languages and incorporates engaging visuals and videos consistent with guidelines from the Malaysian Ministry of Health. The content, carefully reviewed by breast cancer and imaging specialists, was pilot tested with 100 women during a breast awareness event in January 2025. **Results:** The responses were highly positive, with users praising its ease of use and informative nature. Participants particularly appreciated the interactive features and visual aids, which facilitated comprehension and sustained engagement. **Conclusions:** This innovative educational approach exemplifies the essence of Society 5.0 by enhancing digital health literacy, providing personalized learning experiences, and applying state-of-the-art technology to improve healthcare delivery and patient empowerment. Ultimately, it fosters a shift towards a human-centered, technology-enhanced healthcare system that prioritizes education, accessibility, and patient involvement.

Keywords: breast health literacy, breast cancer, breast imaging

ETJ004

Scattered Radiation Dose Mapping Using Personal Electronic Dosimeter in Mobile Fluoroscopy Imaging

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Introduction: Mobile fluoroscopy, particularly utilizing C-arm imaging systems, is indispensable for guiding complex diagnostic and interventional procedures, yet it inherently exposes personnel to significant radiation doses. The aim of this paper was to determine the amount of scattered radiation dose for the mobile fluoroscopy c-arm imaging using dose mapping. **Methods:** A Siemens Siremobil Compact L mobile fluoroscopy system was used to scan the CIRS Model 903 Radiography/Fluoroscopy QA Phantom. The Personal Electronic Dosimeter was fixed at five different distances (0.25, 0.5, 1.0, 1.5 and 2.0 m) at eight different angles around the x-ray tube (0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°). The phantom was exposed using the tube voltage 74 kVp and Automatic Exposure Control (AEC) fixing a 20 cm source to image distance (SID), simulating an AP and lateral projection hip imaging procedure. **Results:** The highest scatter radiation dose was at a distance of 0.25m from the x-ray tube for both, AP and lateral projection. Meanwhile, the lowest scattered dose was at an angle of 0°. The scattered radiation dose mapping indicated that the radiation workers will receive a dose of 20 mSv/year at a distance of 0.28 m, students is 6 mSv/year at a distance of 0.6 m while public is 1 mSv/year at a distance of 1.29 m from the x-ray tube. **Conclusions:** The measured scattered radiation doses were within the acceptable annual dose limits according to the Atomic Energy Licensing Act 1984 (Basic Safety Radiation Protection) Regulations 2010, fostering a more informed and proactive radiation safety culture.

Keywords: mobile fluoroscopy, C-arm imaging systems, personal electronic dosimeter, scattered radiation, dose mapping

ETJ006

Influence of Subject Specific Factors on Myocardium Native Longitudinal Relaxation Time (T1) Values: A Retrospective Study

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Introduction: Native myocardial T1 is a sensitive biomarker in CMR that reflect tissue changes and can vary with biological factors. This retrospective study explores how subject-specific factors influence these values.

Methods: 60 CMR datasets acquired using 3.0 Tesla (3T) scanner were retrospectively analyzed. Using IntelliSpace Portal (ISP) software, the T1 measurement were performed based on American Heart Association (AHA) 17-segment model. Patient demographic data (e.g., age, gender, BSA), cardiac function parameters (e.g., LVEF, LVMI) and myocardial native T1 values were collected. Global and septal native T1 values were analyzed in relation to age, gender, LVEF and BMI. **Results:** Global T1 were higher in males than females (1303.10±55.86ms vs 1280.50±46.23ms), but not statistically significant (p=0.154). For septal T1 (female>male: 1290.62±64.95ms vs 1287.32±80.56ms, p=0.903). Global T1 showed a moderate negative correlation with LVEF (r = -0.59), and a moderate positive correlation with LVMI (r = 0.55), which stronger in female (r = -0.74 vs. r = -0.51, and r = 0.63 vs. r = 0.45, respectively). Septal T1 also correlated with global T1 (r = 0.53), LVMI (r=0.29), and showed a weaker negative correlation with LVEF (r = -0.36). **Conclusions:** Native myocardial T1 values are moderately influenced by heart function and muscle mass, with stronger association in females.

Keywords: myocardial T1 mapping, cardiac magnetic resonance (CMR), subject-specific factors, 3T MRI, Left ventricular function

ETU001

Analysis of Dees Radius Changes to the Energy Produced by Cyclotron as a Proton Accelerator Using Python Programming

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Introduction: Proton radiotherapy is a cancer treatment that minimizes damage to healthy tissue. Currently, cyclotrons are the most commonly used proton accelerators. Designing a cyclotron requires determining parameters such as dees radius, magnetic field strength, and electric potential to achieve the desired energy. This study examines the relationship between dees radius and the energy produced by a cyclotron proton accelerator using Python programming. **Methods:** This study employed an in silico approach with Python in Jupyter Notebook Integrated Development Environment. Control variables included proton charge, mass, voltage, magnetic field strength, and dees plate distance. The independent variable was dees radius; the dependent variable was kinetic energy. **Results:** Proton motion generated energies of 0.4426 MeV, 1.644 MeV, 3.941 MeV, 7.246 MeV, and 11.10 MeV for dees radii of 0.1–0.5 m. An increase in the dees radius leads to more proton rotations, causing more frequent gap crossings, which in turn raises the proton speed and kinetic energy. **Conclusions:** The size of the cyclotron dees radius can be adjusted according to the energy requirements needed to kill cancer cells

Keywords: python, proton radiotherapy, cyclotron

ETU005

The Differences Between BM3D And NLM Denoising Techniques to Improving Thoracic Image Information in Low Field MRI

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Introduction: The modality can be used for thoracal MRI examination is low field MRI machine. Its weakness is that it produces low signal & noise. If the signal and noise is high, the SNR value is low. Denoising technique is the right solution to remove noise. BM3D & NLM denoising techniques are able to increase SNR. BM3D technique has better capability than NLM technique. The research objective is to analyze the difference in image quality and anatomical information on Thoracal MRI images with low field MRI Machine before and after the application of BM3D and NLM denoising techniques. **Methods:** Quasi-experimental research on thoracal MRI images before and after the application of BM3D and NLM denoising techniques. BM3D and NLM denoising techniques totaling 15 samples. BM3D and NLM denoising and assessment of Thoracal MRI images, including SNR, CNR, MSE, PSNR. **Results:** There is a difference in image quality, MSE, PSNR values, and anatomical information of thoracal MRI image before and after denoising technique, with p-value <0,001. **Conclusions:** The BM3D denoising technique is more optimal in improving image quality and anatomical information on thoracal MRI image; a study on low field MRI.

Keywords: low field MRI, BM3D, NLM, denoising, thoracal

ETC009

Effects of Ionizing Radiation on *Escherichia Coli* (*E. Coli*) Bacteria

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Introduction: This study delves into the intricate relationship between ionizing radiation and *Escherichia coli* (*E. coli*), a bacteria vital for digestion, nutrient absorption, immune system support and protection against harmful pathogens. While many studies have examined radiation's impact on gut microbiota, few focus specifically on X-ray effects on *E. coli*. Understanding this is crucial for improving treatment planning and minimizing tissue damage in medical settings. This research was conducted to determine the effects of ionizing radiation on *E. coli* bacteria, focusing on morphological changes before and after exposure to varying technical factors such as kVp, mAs, and SID over a designated period. **Methods:** An experimental research method was employed, observing both a control group and a radiation-exposed group under increasing technical factors with immediate and five-day post-exposure assessments. Moreover, a quantitative approach was used for analysis, with data collection facilitated through systematic tabulation. The study examined four cultured strains of *E. coli*, including two assays of *E. coli* ATCC 25922 and two derived from a stool culture. **Results:** The results of the study revealed that higher intensities of radiation might lead to delayed morphological changes in the bacteria, including alterations in shape, size, surface, and margin. **Conclusions:** The study concludes that ionizing radiation does not immediately affect *E. coli* colony viability, however, gradual changes in colony morphology were observed three days after being exposed to ionizing radiation. Consequently, studying the effects of ionizing radiation on *E. coli* benefits radiologic technologists and others by advancing understanding in radiation biology and microbiology.

Keywords: *Escherichia Coli*, morphology, colony, ionizing radiation, normal flora

e-POSTER PRESENTATION

ET009

Assessment of Image Quality Using Standard Contrast Injection and Weight-Based Contrast Injection Protocols in Coronary CT Angiography

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Introduction: Optimal contrast enhancement is crucial in Coronary Computed Tomography Angiography (CCTA) for accurate visualization of coronary arteries and cardiovascular disease diagnosis. The standard protocol employing a fixed contrast volume, may result in excessive contrast for smaller patients and insufficient enhancement for larger patients, thus leading to the risk of contrast-induced nephropathy and compromising diagnostic accuracy. This study assesses the image quality of CCTA images using a weight-based contrast injection protocol against a standard protocol. **Methods:** A retrospective image analysis was performed on CCTA examination which was acquired using weight-based injection (n=50) and standard injection (n=50) protocols. Signal-to-noise ratio (SNR) and contrast-to-noise ratio (CNR) were measured in the region of interest of the left coronary artery (LCA) and right coronary artery (RCA). The mean SNR and CNR were compared using independent t-tests. **Results:** The weight-based protocol demonstrated significantly higher SNR (LCA: 8.83 ± 4.03 vs. 4.09 ± 1.70 , $p < 0.001$; RCA: 8.42 ± 6.21 vs. 4.14 ± 2.27 , $p < 0.001$) and CNR (LCA: 10.35 ± 4.76 vs. 4.31 ± 1.99 , $p < 0.001$; RCA: 9.42 ± 6.46 vs. 4.31 ± 2.79 , $p < 0.001$) in both coronary arteries compared to the standard protocol. Overall, the weight-based protocol demonstrated 7.96% reduction of contrast volume relative to standard protocol. **Conclusions:** The weight-based contrast injection protocol significantly improves the CT image quality. This technique may offer a cost-effective strategy by optimizing contrast media dose for individual patients, hence leading to improved diagnostic accuracy in CCTA.

Keywords: coronary computed tomography angiography, contrast media, image quality, weight-based protocol

ET013

Knowledge And Awareness of Magnetic Resonance Imaging Safety Among Healthcare Workers in A Single Medical Centre

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Introduction: Magnetic resonance imaging (MRI)-related incidents reported to the U.S. Food and Drug Administration (FDA) between 2008 and 2017 indicated that 59% involved serious thermal injuries, followed by 11% traumatic events, 9% projectile-related accidents, and 6% acoustic injuries. Locally, a medical centre in Klang Valley recorded three projectile-related MRI incidents between 2015 and 2023 that involved both clinical and non-clinical staff. Despite these occurrences, no official study in Malaysia has assessed healthcare workers' knowledge and awareness of MRI safety protocols. Given their critical role in ensuring a safe MRI environment, this study aimed to evaluate the level of MRI safety knowledge and awareness among healthcare workers at a single medical centre. **Methods:** A descriptive cross-sectional study was conducted using a structured questionnaire distributed electronically from August to October 2024. A total of 268 healthcare workers from various departments voluntarily participated. Scores were categorised as high, moderate, and low levels of knowledge and awareness. **Results:** Associations with demographic factors were analysed using the chi-square test. The results indicated that most participants demonstrated good knowledge and awareness of MRI safety. Significant associations were found between professions and both knowledge and awareness. However, no statistically significant associations were observed with gender or age. Although education and work experience were not significantly associated with knowledge levels, both were significantly associated with awareness. **Conclusions:** This study provides the first local baseline data on MRI safety knowledge and awareness, highlighting the need for role-specific training and supporting policy development to enhance MRI safety practices.

Keywords: awareness, knowledge, MRI safety, healthcare workers

ET014

Awareness of Hospital-Acquired Infections and Hand Hygiene Practices Among Patients and Public Attendees at the Radiology Department

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Introduction: Hospital-acquired infections (HAIs), or nosocomial infections, occur within 48 hours of care or 30 days post-discharge. Affecting 1.7 million patients annually, HAIs cause over 98,000 deaths. Hand hygiene plays a vital role in transmission. The World Health Organization (WHO) defines infection control practices (ICP) as methods to reduce infection risks in healthcare settings through prevention and hygiene measures. A better understanding of patients' knowledge and attitudes enhances intervention effectiveness. However, limited research exists on patients' education about ICP and their awareness of HAIs remains underexplored and insufficiently assessed. Therefore, this study aimed to evaluate the HAIs awareness level and hand hygiene practice's level. **Methods:** 145 outpatients and visitors to the radiology department participated in this cross-sectional study. Information on sociodemographic, awareness and knowledge, and hand hygiene practices was gathered using a self-administered questionnaire. A mean score interpretation and correlation coefficient interpretation were used to assess the degree of correlation and awareness between sociodemographic, practice, and awareness factors. **Results:** The descriptive analysis revealed that the mean awareness score for patients and public attendees was very low (1.46), while the mean practice score was medium (3.15). The results of the Pearson correlation test showed a significance value of 0.002 and $r = -0.25$. This suggested that the relationship between awareness and practice was weak but statistically significant. **Conclusions:** In summary, the study revealed that awareness has a negligible effect on the degree of practice of patients and public attendees.

Keywords: hospital-acquired infections, infection control practices, hand hygiene practices, radiology department

ETJ005

3D Cine for the Assessment of the Heart: A Systematic Literature Review

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Introduction: Cardiac CINE MRI is used to obtain cardiac morphology and function. Conventional CINE MRI, a 2D CINE MRI, shows several drawbacks, which are not feasible for the patient and require multiple image acquisitions, resulting in increased planning and scanning time. 3D CINE MRI has been introduced to improve the performance of CINE imaging, along with algorithms and techniques to obtain the best cardiac information and give superior comfort to the patient. Therefore, this aims to analyse the image acquisition in CINE imaging, then explore the algorithms and techniques used in the 3D CINE MRI and the diagnosis by the 3D CINE MRI. **Methods:** This systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) using electronic databases, PUBMED and SCOPUS. **Results:** Ten papers within five years of publication (2019 – 2024) are included in this review. Image acquisition of the CINE imaging is done in two modes: the free-breathing and breath-holding series. Most of the studies were done in free-breathing mode to provide the best comfort to the patient. The algorithms and techniques approach with the 3D CINE MRI help improve image acquisition and reconstruction. The use of 3D CINE MRI varies among healthy individuals and patients with cardiovascular diseases. The differences in ventricular measurements can be analysed for each condition of the heart. **Conclusions:** The approaches by the studies have their own strengths and limitations, but most of them are able to give superior comfort to the patient.

Keywords: 3D CINE, cardiac assessment, algorithm, cardiovascular disease

ETU011

Analysis of Dose History and Health of Radiation Workers in Radiology Installation of PKU Muhammadiyah Hospital Bantul and Panti Nugroho Hospital Sleman

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Introduction: The Radiology Department is a vital unit in hospitals that provides diagnostic and interventional services. However, exposure to ionizing radiation poses health risks for radiation workers. To ensure their safety, regular radiation dose monitoring and health examinations are necessary. This study aims to analyze the radiation dose history and health status of workers in the Radiology Department of RS PKU Muhammadiyah Bantul and RS Panti Nugroho Sleman. **Methods:** This study employed a qualitative method with a descriptive approach. Data were collected through observation, interviews, literature studies, and documentation from 12 radiographers and 1 radiologist at RS PKU Muhammadiyah Bantul, and 6 radiographers at RS Panti Nugroho Sleman. Data analysis was conducted through data reduction, data presentation, and conclusion drawing. **Results:** The radiation doses received by workers at both hospitals remain within the safe limits as regulated by BAPETEN Regulation No. 13 of 2013 (maximum 20 mSv/year). However, not all workers have consistently undergone dose monitoring, particularly those not yet permanent employees. Health examinations showed normal hemoglobin levels, but some workers experienced elevated leukocyte levels, impaired liver function (SGOT/SGPT), and leukocyturia in urine tests. **Conclusions:** Radiation doses received by radiology workers in both hospitals are within safe limits. Dose monitoring is carried out periodically but is not yet consistent for all staff. Health examinations are generally normal, although some indicators of potential health issues were observed in several workers.

Keywords: occupational safety, dose monitoring, health monitoring, radiology

ADDITIONAL ABSTRACTS

ET005

Scattered Radiation and Exposure Dose Mapping of Micturating Cystourethrogram and Barium Swallow in the Fluoroscopy Room: A Phantom Study

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Introduction: Scatter radiation is inevitable in fluoroscopy procedures, particularly interventional fluoroscopy procedures. Proper awareness of positioning within the fluoroscopy room is crucial to minimizing radiation exposure. This study aims to map the distribution of scattered radiation and determine exposure levels during pediatric Micturating Cystourethrogram (MCUG) and Barium Swallow procedures at the Radiology Department of Hospital Sultan Abdul Halim (HSAH). **Methods:** Scattered radiation levels were measured using survey meters placed around a water phantom. Measurements were taken at eight angles (0°, 45°, 90°, 135°, 180°, 225°, 270°, and 315°) and two distances (0.5 m and 1.0 m) from the phantom. The height of the fluoroscopy table was kept constant. A total of 48 positions were assessed, with each measurement repeated three times to determine the mean and standard deviation of scatter doses. The data was placed into the initial sketch of the distances and angles of the survey meter accordingly. **Results:** Statistical analysis revealed that both the angle and distance of the survey meter significantly influenced scatter radiation levels ($p < 0.05$). There is no significance between the two variables, indicating their independent effects on scatter radiation dose. The lowest radiation levels were recorded at the 315° angle and 1.0 m distance from the phantom, suggesting this position is safest for staff during both procedures. **Conclusions:** Scatter radiation levels vary based on position in the fluoroscopy room. Mapping dose distribution helps identify safer zones, guiding staff to minimize radiation exposure during MCUG and Barium Swallow procedures.

Keywords: scattered radiation, mapping dose, fluoroscopy, micturating cystourethrogram, barium swallow

ET015

Determination of Scattered Radiation on General X-Ray Tabletop Using Dose Mapping Technique

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Introduction: Scatter radiation is an essential parameter to be measured in diagnostic imaging, as it can degrade image quality and increase radiation exposure to both patients and healthcare personnel. Due to the invisible nature of X-rays, scatter radiation cannot be directly visualized and must be quantified using indirect measurement techniques such as dosimetry during patient exposure. This study investigates the distribution of scatter radiation on a general X-ray tabletop using a dose mapping technique, with a specific focus on the examination couch area where the patient is positioned during the imaging procedure. **Methods:** Scatter doses were recorded at 15 locations on the general X-ray tabletop using nanoDot™ optically stimulated luminescence dosimeters, arranged in a grid with 50 cm horizontal and 25 cm vertical spacing. An anthropomorphic upper body phantom was positioned centrally to simulate patient attenuation. Standard chest X-ray exposures with proper collimation were performed at three exposure settings: 60 kVp/2.0 mAs, 70 kVp/2.5 mAs, and 80 kVp/3.2 mAs. Dosimeters were analyzed using MicroStar reader and the data were processed in Microsoft Excel to generate 3D graphs illustrating the scatter dose distribution. **Results:** Results showed that scatter radiation was most intense along the central axis of the X-ray beam. As a result, scatter radiation is concentrated near the beam's central axis. **Conclusions:** The method effectively maps scatter radiation across the general X-ray tabletop and identifies intensity variations associated with the heel effect. Furthermore, awareness of scatter radiation distribution is essential for the effective implementation of radiation safety procedures.

Keywords: scattered radiation, mapping technique

ETJ003

Quantitative Assessment of Entrance Surface Doses for Trauma Patients During Multifield Plain Radiography Procedures: A Phantom Study

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Introduction: Trauma patients often require several radiographic examinations, leading to increased exposure to ionizing radiation. Optimizing imaging parameters is essential to ensure patient safety while maintaining diagnostic accuracy. This study aims to compare entrance surface doses (ESDs) between standard guideline-recommended imaging parameters and those used in clinical practice to support radiation dose optimization. **Methods:** The ESDs were directly measured using thermoluminescent dosimeter (TLD) chips placed on a whole-body PIXY® phantom. For the indirect method, ESDs were estimated using data on the X-ray tube radiation output and exposure parameters (kVp and mAs), following the guidelines of the International Atomic Energy Agency (IAEA) Technical Report Series No. 457. Measurements were performed across five different X-ray anterior-posterior (AP) projections, including skull, chest, abdomen, pelvis, and lumbar. Exposure settings were selected based on two approaches: standard and clinical exposure conditions. **Results:** The analysis showed notable differences in X-ray exposure parameters between standard guidelines and clinical practice. For standard exposures, mean ESDs (direct method) ranged from 0.22 mGy (chest) to 1.35 mGy (skull), while clinical exposures showed a wider range, from 0.20 mGy (chest) to 2.46 mGy (abdomen). Similar trends were observed with the indirect method. Overall, the ratio of clinical to standard ESDs ranged from 0.51 to 1.00. **Conclusions:** The findings highlight significant differences in ESDs between standard and clinical imaging protocols, underscoring the need for greater adherence to guideline-recommended parameters. This comparison supports efforts toward radiation dose optimization, promoting safer and more consistent radiographic practices.

Keywords: entrance surface dose, radiography, exposure factor, TLD, quality control

ETU002

Image Analysis of Radiographic Cranial Examinations Using Analog Grid and AI-Based Grid

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Introduction: Cranial radiography is a critical diagnostic procedure that demands high-quality imaging to accurately visualize complex anatomical structures within the skull. Traditionally, manual grids have been employed to reduce scattered radiation and enhance image contrast, thereby improving overall image quality. However, these physical grids often present limitations in clinical settings due to their cumbersome nature, increased radiation dose requirements, and reduced workflow efficiency. In response to these challenges, digital radiography systems have introduced software-based virtual grids, such as AI-enhanced grids, which aim to replicate the benefits of physical grids while improving dose efficiency and workflow flexibility. **Methods:** Despite their growing use, comprehensive clinical validation and comparative analysis between manual and virtual grids—especially in cranial applications—remain limited. This study aims to evaluate cranial image quality using both manual (analog) and AI-based virtual grids under varying exposure conditions. The evaluation criteria include contrast, sharpness, anatomical detail, and artifact presence, along with an assessment of radiation dose efficiency. Data were obtained through an experimental approach using a head phantom in the radiology laboratory at Universitas 'Aisyiyah Yogyakarta. **Results:** showed that the AI Grid at a lower exposure (80 kV, 200 mA, 10 mAs) achieved the highest average image quality score of 4.88, compared to the Analog Grid (4.47) and AI Grid at standard exposure (3.82). **Conclusions:** These findings suggest that low-dose AI Grid technology not only maintains but may even improve image quality while significantly reducing patient radiation exposure.

Keywords: radiography cranium, grid manual, virtual grid

ETU003

Uniform Whole Body Immobilization Device for Radiotherapy

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Introduction: Radiotherapy is a treatment modality that utilizes radiation, either from radioactive sources or generated by a Linear Accelerator (Linac). To ensure precise targeting and protect surrounding healthy organs, accurate and stable patient immobilization is essential. Immobilization devices vary by treatment area—such as the head, head and neck, thorax, and pelvis—but are typically limited to one unit per type, posing challenges when treating multiple patients with similar conditions simultaneously. This study aims to evaluate the accuracy of a newly developed immobilization tool called UNIMOB (Uniform Whole Body Immobilization Device), designed as an affordable and flexible alternative. **Methods:** The research follows experimental design, constructing the UNIMOB using an 11 mm-thick acrylic baseplate, a vacuum-formed headrest, and a thermoplastic mask for individualized immobilization. The UNIMOB's performance is compared to standard immobilization equipment in terms of positioning accuracy, reproducibility, and safety. **Results:** Show that the vacuum headrest, filled with moldable styrofoam beads, adapts precisely to the shape of the patient's head, while the acrylic baseplate offers safe attenuation during irradiation. UNIMOB meets the clinical criteria for consistent and reproducible positioning. Moreover, verification tests demonstrate low setup error values, supporting its effectiveness. **Conclusions:** The UNIMOB device enhances treatment precision and offers a cost-effective solution for radiotherapy departments, especially those with limited resources or in scenarios requiring simultaneous treatment for multiple patients with similar anatomical sites.

Keywords: immobilization device, uniform whole body immobilization device, accuracy

ETU004

BNO–IVP Examination Procedure with Clinical Ovarian Cyst

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Introduction: The ovarian cyst is a fluid-filled lump in the ovary which is a reproductive disorder in women during the reproductive period. Examination at the hospital uses a lateral projection which is carried out after post-micturition so it is necessary to know the purpose of the examination. This study aims to determine the examination procedure and reasons for additional lateral projection in RSUD dr. Loekmono Hadi Kudus.

Methods: This research is qualitative with a descriptive method and a case study approach. The research was conducted at the Radiology Installation of RSUD dr. Loekmono Hadi Kudus from October 2023 to June 2024. The research subjects were 2 radiology specialists and 3 radiographers. Data were collected by means of observation, interviews, documentation, and literature review. The data analysis included data reduction, data presentation, and drawing conclusions. **Results:** The results of the study showed that the BNO – IVP examination procedure started with preparing the patient for 2 days and fasting for approximately 6-8 hours before the examination, using a plain AP plain abdominal projection, then inserting the water-soluble iodine contrast media using a 10 and 20 cc syringe via the intravenous injection, AP post contrast 5 minutes, 15 minutes, 45 minutes projection, AP supine post micturition, and lateral projection. **Conclusions:** The examination begins with a plain abdominal radiograph, AP post contrast 5 minutes, 15 minutes, 45 minutes projection, AP supine post micturition, and lateral projection. The reason for using lateral projection was to see if the mass was pressing against the ureter.

Keywords: ovarian cyst, BNO–IVP, lateral projection, radiography

ETU009

Apron Leak Testing using Detectors in The Radiology Installation of The General Hospital Dr. Soehadi Prijonegoro Sragen

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Introduction: Aprons are radiation protective equipment that require good care and maintenance to prevent damage to internal fractures. In storage, the apron should not be folded, hung, and stacked because it will reduce the effectiveness of radiation protection. The frequency of apron testing is carried out periodically, namely once every 12-18 months to ensure optimal protection when used. In the Radiology Installation of Dr. Soehadi Prijonegoro Sragen Regional General Hospital, aprons were found to be stored in an improper manner, namely unfolded and stacked, and the last test was conducted in 2022. This study aims to determine the testing procedures, test results, and maintenance of aprons in the installation. **Methods:** This study used a mix-method approach with quantitative data from test results and qualitative data from interviews, documentation, and secondary sources such as laws and articles. Data collection was carried out in October 2024-April 2025 at the Radiology Installation of Dr. Soehadi Prijonegoro Sragen Regional General Hospital. **Results:** The results showed that the three aprons were stored stacked and cleaned using wet wipes or alcohol. Tests showed no leaks, but there were waves, dents and creases on the aprons. **Conclusions:** The third test of the apron was carried out by radiographic method, for the test results there were no leaks but there were visible waves and indentations or folds on the apron, the indentations on the apron were caused by improper storage such as being stacked.

Keywords: apron, test, maintenance

ETU012

Analysis of X-Ray Radiation Exposure Safety in the Radiology Installation of Panti Nugroho Hospital Sleman

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Introduction: Radiology plays a vital role in early diagnosis and risk assessment through real-time imaging. However, ensuring radiation safety is essential to protect patients, healthcare workers, and the public from excessive ionizing radiation exposure. This study aims to analyze the safety of X-ray radiation exposure in the Radiology Installation of Panti Nugroho Hospital, Sleman. **Methods:** This research used a mixed-methods approach with an explanatory design conducted from August 2024 to January 2025. Quantitative data were obtained by measuring radiation levels at 10 points, each measured three times. The results were calculated using standard formulas and compared to the dose limits set by BAPETEN Regulation No. 5 of 2016. Qualitative data were gathered through interviews with a radiation protection officer who also serves as the unit head. **Results:** The highest radiation exposure from the conventional X-ray unit was found at Point 5 (operator glass) with 0.33 $\mu\text{Sv/h}$. For the panoramic unit, the highest value was also at Point 5 with 0.03 $\mu\text{Sv/h}$. Safety procedures such as room management, provision of PPE, routine exposure testing, TLD usage, equipment maintenance, and health monitoring have been implemented consistently. **Conclusions:** Radiation exposure levels remain within safe thresholds ($\leq 2.28 \mu\text{Sv/h}$ for workers and $\leq 0.11 \mu\text{Sv/h}$ for the public). Operating two modalities in the same room does not significantly increase radiation levels if not used simultaneously. Continued monitoring and periodic evaluation of room layout are recommended to ensure ongoing safety and efficiency.

Keywords: radiation exposure, radiation workers, public safety, dose limit, risk assessment

ETU013

Comparative Analysis of Abdominal Image Information Using Physical Grid and Virtual Grid

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Introduction: Abdominal imaging requires a high exposure factor due to its thickness, causing scattered radiation that can degrade radiographic image quality. The use of grids is essential to enhance image clarity. Virtual grid, which integrate scattered and primary radiation, improve image quality by reducing scatter and increasing the proportion of primary radiation captured, unlike physical grid that introduce noise. This study aims to compare abdominal image information quality between physical and virtual grid usage. **Methods:** A quantitative experimental research design was employed, conducted between September 2024 and April 2025. Collecting data through a structured questionnaire, validated by one radiology specialist, and completed by three radiology specialists with a minimum of ten years of clinical experience. Statistical analysis was performed using SPSS software, employing the Wilcoxon test. **Results:** Analysis obtained an Asymp. Sig. (2-tailed) value of 0.034, which is below the significance threshold (p-value) of 0.05. Thus, the alternative hypothesis (H_1) is accepted, indicating a statistically significant difference in image information between abdominal radiographs obtained using physical and virtual grids. Virtual grid can enhance anatomy visualization better than physical grid. **Conclusions:** Abdominal images show differences in information when utilizing physical grids compared to virtual grids, with virtual grids enhancing anatomy visualization, making them preferred over physical grids.

Keywords: image information, abdomen, physical grid, virtual grid

ETU014

The Use of 3D Reconstruction in CT Scan Examination of Elbow Joint with Dislocation Cases at Surakarta Orthopedic Hospital

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Introduction: Patients with elbow joint dislocations had CT scans with 2D and 3D reconstructions, in some studies, it is sufficient to examine the elbow joint using conventional radiography with anteroposterior and lateral projections. However, in some cases that cannot be evaluated using conventional radiography, a CT scan can facilitate diagnosis, particularly when enhanced with multiplanar and 3D imaging to provide better assessment. **Methods:** This study employed a descriptive qualitative methodology utilizing a case study approach to examine CT scans of elbow joint dislocations at the Radiology Installation of Prof. Dr. R Soeharso Orthopedic Hospital Surakarta, conducted from September 2024 to March 2025. **Results:** A CT scan of the elbow joint exhibiting clinical dislocation was performed with standard preparation. The patient was positioned supine on the examination table with feet oriented first, utilizing 2D and 3D reconstruction, covering a scanning area from 1/3 distal humerus to 1/3 proximal antebrachia. The reason for employing 3D reconstruction is that the dislocation has persisted for over 24 hours and is categorized as severe. 3D reconstruction helps radiologists in visualizing indicators that are challenging to assess with traditional radiography, such as microfractures. It facilitates communication among doctors regarding the assessment and treatment plans for patients with dislocations. **Conclusions:** The utilization of 2D and 3D reconstruction in CT scan evaluations of the elbow joint facilitates diagnoses that are unattainable through conventional radiography, prompting researchers to support these techniques in dislocation cases.

Keywords: CT scan, elbow joint, 2D and 3D reconstruction

ETU019

Thorax Radiography Examination Procedure in Dengue Haemorrhagic Fever (DHF) Cases at the Radiology Installation of Roemani Muhammadiyah Hospital Semarang

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Introduction: Dengue Hemorrhagic Fever (DHF) is a fatal dengue fever, the supporting action taken is a thorax examination. Thorax examination in cases of pleural effusion is performed using AP, PA and Lateral Dicubitus projections with patient preparation for 5 minutes (Long et al, 2016). While at Roemani Hospital Semarang, thorax examination in DHF cases uses AP and RLD (PA) projections with patient preparation for 30 minutes. **Methods:** using qualitative research with a case study approach conducted at Roemani Hospital Semarang in December 2024-May 2025, data collection was carried out by observation, interviews and documentation. **Results:** The results of the study showed that in thorax examination of DHF cases in the RLD projection using a waiting time of 30 minutes the reason is so that fluid can collect more optimally below and in thorax examination using AP and RLD (PA) projections the reason for using RLD projection in the PA position is to minimize fixation devices and device factors. **Conclusions:** Thorax examination procedure of DHF cases in the Radiology Installation of Roemani Hospital Semarang was carried out with AP projection and RLD PA position. Patient preparation was carried out with a waiting time of 30 minutes. The reason for the 30-minute waiting time on the RLD projection is so that the fluid can collect maximally below and on the RLD projection using the PA position is to make it easier for the patient and minimize fixation devices and device factors.

Keywords: thorax, dengue haemorrhagic fever, pleural effusion

ETU020

Use of Pitch in Head CT Scans for Trauma Cases at Banyumas Regional General Hospital

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Introduction: Banyumas Regional General Hospital examination head CT scans for trauma cases. The use of pitch parameters in CT scans is crucial for producing high-quality images while minimizing the radiation dose received by the patient. However, there are variations in the application of optimal pitch usage in head CT scans at RSUD Banyumas. This study aims to determine the procedure for head CT scans in trauma cases, the appropriate pitch usage, and the resulting image quality. **Methods:** This type of research is using descriptive qualitative with a case study approach. The author explains in general about the Use of Pitch in Head CT Scan Examination in Trauma Cases at Banyumas Regional Hospital. **Results:** The head CT scan procedure for trauma at RSUD Banyumas follows the standard head CT scan trauma protocol, with the patient positioned supine head first, and a pitch parameter of 0.55 is used. A lower pitch can improve image detail and noise, albeit with the risk of a higher radiation dose. Noise is determined by the standard deviation used. The standard deviation used at RSUD Banyumas is 21 HU. The resulting image quality meets diagnostic standards, with assessment by a radiologist indicating that the images produced are sufficiently informative for diagnosis. **Conclusions:** the appropriate use of pitch in head CT scans for trauma at RSUD Banyumas significantly influences the resulting image quality. Therefore, it is important for medical personnel to understand and optimally apply this parameter to improve diagnostic outcomes and patient safety.

Keywords: pitch, image quality, CT head trauma

ETC001

Patient's Perception of Radiation Safety Protocols in Radiation Therapy Facility in Batangas

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Introduction: Patient education on radiation safety is crucial in minimizing anxiety and ensuring compliance during radiation therapy. However, the extent to which patients understand these protocols remains underexplored. This study aimed to assess patient's perceptions of radiation safety before and during treatment in hospital in Batangas. **Methods:** A descriptive design was employed among 27 patients undergoing radiation therapy. An adapted questionnaire was administered to gather data on demographic variables and perceived understanding of safety measures. Statistical analyses were performed to identify relationships between demographic factors and patient understanding. **Results:** Findings revealed most respondents were aged 41–50 years, female, and held at least a bachelor's degree. Cervical cancer was the most common diagnosis. Participants reported high perceived understanding of safety protocols before and during treatment, with strong agreement on awareness and communication experiences. No significant relationship was found between understanding and age, sex, or cancer type. However, educational attainment showed a significant inverse correlation with understanding in the pre-treatment phase, suggesting that higher education levels don't guarantee better comprehension of radiation safety. **Conclusions:** These findings emphasized the need for clear patient education regardless of educational background. The development of standardized informational materials is recommended to enhance patient comprehension and ensure safety across diverse populations. This study highlighted the need for healthcare facilities to identify and address communication gaps in the implementation of radiation safety protocols. By enhancing the delivery of information and education strategies, facilities can strengthen patient trust and improve their overall treatment experiences.

Keywords: radiation therapy, radiation safety protocols, patient perception

ETC002

Clinical Education Assessment of Radiologic Technology Interns of CEFI In Computed Tomography

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Introduction: Computed tomography (CT) has emerged as a crucial imaging modality, necessitating radiologic technology interns to prove high levels of competency prior to complete clinical practice. This study aimed to evaluate and compare the competency levels of interns in CT as rated by CT technologists and interns. This study aim to identify the competency levels of radiologic technology interns in patient care and management, image production, and radiation safety. **Methods:** The participants of the study includes twenty-three (23) Radiologic Technology Interns, and one (1) CT Technologists from each affiliated hospital. A quantitative, comparative design was utilized, employing the Wilcoxon Signed-Rank test to compare the differences between the two assessment sets. **Results:** Results indicated that interns rated themselves higher in all areas than CT technologists' ratings, with significant differences found in patient care and management ($p = 0.002$), image production ($p = 0.001$), and radiation safety ($p = 0.023$), reflecting a gap between intern self-perception and clinical findings. **Conclusions:** The findings emphasize the effectiveness of existing academic training while highlighting calls for improved clinical mentorship and radiation safety reinforcement, playing a role in curriculum development and advocacy for strategies to improve student self-perceptions relative to subsequent clinical performance.

Keywords: computed tomography, competency, radiologic technology interns, CT technologist

ETC003

Difficulties Encountered by Computed Tomography Scan Technologist in Handling Traumatic Brain Injury Patient

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Introduction: Traumatic Brain Injury (TBI) poses unique challenges in diagnostic imaging, especially for Computed Tomography (CT) scan technologists who managed difficulties related to patient positioning, communication, cooperation, and time constraints. This study aimed to identify the specific challenges encountered by CT technologists when handling TBI patients and examine whether demographic variables influence these challenges. **Methods:** Using a descriptive quantitative method, the researchers surveyed 33 CT technologists working in hospitals and clinics around Lucena City. Data were analyzed using frequency and percentage, weighted mean, Spearman's rho, and Mann-Whitney U test. **Results:** The results indicated that patient cooperation was the most significant challenge, followed by difficulties in positioning and communicating with disoriented or aggressive patients. Time constraints during emergency scans also notably impacted workflow. A significant difference was found in positioning difficulties between male and female technologists, while age and caseload showed no significant effect. **Conclusion:** The study recommends targeted training, institutional support, and improved trauma imaging protocols to enhance technologists' preparedness and ensure better care for TBI patients in emergency settings.

Keywords: CT technologists, traumatic brain injury, emergency setting

ETC005

Exploring Glutinous Rice Flour as an Alternative to Ultrasound Gel: Efficacy, Safety, and Practicality

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Introduction: The research examined the use of glutinous rice flour (GRF) as a substitute to commercially available ultrasound gel because of the scarce supply and expensive costs of regular gels in low-resource health care facilities. A quantitative experimental contrast of GRF and commercial gel was done by researchers and assessed by seven professionals, three sonographers, three sonologists, and one dermatologist. **Methods:** Abdominal organs scanned by evaluators consisted of liver, gallbladder, pancreas, spleen, kidneys and urinary bladder on researchers with three various body habitus namely hypersthenic, sthenic and asthenic. The sonographers and sonologists rated the quality of the images in terms of penetrability, echogenicity, and the resolution. **Results:** GRF gel was very effective as the weighted mean scores were 3.78, 3.63 and 3.63 in penetrability, echogenicity and resolution respectively. The skin test of the gel performed by a dermatologist indicated no allergic reactions, redness, and discomfort. GRF gel was of suitable viscosity and simple to spread, which allowed movement of transducers and provided consistent image quality. At refrigerated conditions with phenoxyethanol, the gel was stable and usable within one month. Its physical properties were suitable to ultrasound imaging. GRF gel was cheaper than Aquasonic, retailed at 1,460.00 (\$26.23) per liter. **Conclusions:** GRF gel is a cost-effective, safe, and practical alternative to commercial ultrasound gel, especially in resource-limited settings where affordability and access are crucial.

Keywords: penetrability, echogenicity, resolution, viscosity, transducers

ETC006

Empowering Communities: A Multifaceted Approach to Raising Awareness for Ionizing Radiation in Diagnostic Imaging

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Introduction: The people are the reason why a community is of being. It is important to consider that in order to create a better tomorrow, knowledge and awareness is of value. The study is concerned on assessing and revamping the awareness of the community about ionizing radiation in diagnostic imaging as a community health education. **Methods:** The researcher, now equipped with information, desires to promulgate ionizing radiation in terms of its benefits and risks to give back to the community. The research is led by a descriptive design which is complimented by a quantitative approach. There are four barangays selected, namely, Halayhayin, Munting Ambling, Poblacion, and Tipunan in the Municipality of Magdalena, Laguna, in which 375 respondents participated in the study. **Results:** Through the implementation of interventions that included a seminar, handing out pamphlets, posting of posters in conspicuous places, and through social media, there is a significant increase in the perceived awareness of the residents. The contrast of pre- and post-test described that despite being somewhat aware, they became fully aware of the benefits and risks of ionizing radiation particularly in diagnostic imaging as expressed by Wilcoxon Signed Rank Test. **Conclusions:** The differences of the effectiveness of the approaches are determined by the formula of Kruskal-Wallis H wherein the seminar being at the top.

Keywords: awareness, community health education, ionizing radiation

ETC007

Factors That Influence the Program Choice of Freshmen Students of the Bachelor of Science in Radiologic Technology: A Quantitative Study of Motivations

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Introduction: Upon choosing their courses, freshmen students rely on several motivations which can help select the appropriate program for each of them. Intrinsic factors include emotions, thoughts, achievements, psychological power, self-realization, and fields of interest. Extrinsic factors include social background, family, environment, education, and socio-economic phenomena of the individual contribute to the formation of internal motivations. **Methods:** The study was conducted with the objective to determine which of the extrinsic and intrinsic factors influenced the freshmen students of Bachelor of Science in Radiologic Technology (BSRT) upon choosing their program and to examine whether it varied among their demographic profile and Senior High School Program strand. A self-made survey questionnaire was utilized by the researchers to gather data from the respondents; the freshmen students enrolled in the BSRT program of Calayan Educational Foundation Inc. during the academic year 2023-2024. Necessary data were collected from a sample of 66 respondents from a population of 75 students upon conducting the survey. **Results:** According to the results of the study, intrinsic factors were the most significant motivating factor. Overall, the students were motivated by Job Opportunities, Personal Interests, Desire to Serve, and Cognitive Skills. On the other hand, Social Influences and Program Advertisements were not considered to be significant factors by the students. **Conclusions:** Furthermore, the program choice of the students is not significantly associated with their demographics.

Keywords: intrinsic factors, extrinsic factors, program choice

ADD001

Knowledge And Awareness of Radiation Protection and Diagnostic Reference Level among Radiographers in Western Coast Region Sabah Hospital

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Introduction: Computed Tomography (CT) is a crucial diagnostic imaging modality which exposes patients to high amounts of ionising radiation. However, knowledge and awareness of radiation protection and diagnostic reference level (DRLs) among radiographers remain inconsistent. This study determines the knowledge and awareness of radiation protection and DRLs among CT radiographers in government hospitals at Western Coast Region of Sabah. **Methods:** This research used a cross-sectional study conducted in three hospitals which involved 71 radiographers who work with CT scan. The questionnaire consists of three sections which are demographic information, knowledge and practice of radiation protection and DRLs. The questionnaires were distributed through Google Forms and shared via online platforms. Total scores for each section were calculated and the results of knowledge and awareness were divided into three levels. **Results:** Findings indicate that 62.0% (n = 44) of radiographers demonstrated high knowledge on radiation protection and DRLs, while 19.7% (n = 14) had moderate knowledge, and 18.3% (n = 13) had poor knowledge. However, awareness levels towards the issue were significantly lower, with 50.7% (n = 36) demonstrating poor awareness, 36.6% (n = 26) moderate awareness, and only 12.7% (n = 9) high awareness. **Conclusions:** These findings show a high knowledge but poor awareness on radiation protection and DRLs among radiographers who involve in CT examination. Strengthening the need for structured training programs and continuous medical education could help to enhance and update radiographer's knowledge and indirectly help to improve awareness and practice when dealing in CT examination.

Keywords: Diagnostic Reference Levels (DRLs), computed tomography (CT), radiographers, knowledge and awareness levels, Western Coast Region of Sabah

ADD002

Diagnostic Reference Level (DRL) of Cardiac Angiography: A Single Centre Study

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Introduction: Coronary arteriography is the gold standard for diagnosing coronary artery disease. This procedure involves the utilisation of continuous X-radiation exposure to provide visual aid for an accurate localisation of the coronary vasculature stenosis. As the X-ray imposed stochastic and non-stochastic effects, the dose delivered to the patient should be scrutinised. The Diagnostic Reference Level (DRL) is a regulatory guideline in radiation dose optimisation, where Malaysia has its reference for the Malaysian population. In angiography, kerma-area product (KAP) is the dosimetry quantity measured to indicate the total amount of radiation delivered to the patient. Therefore, this study was conducted to establish a local DRL for a teaching hospital in Selangor to ensure the dose delivered to patients is within the limit. **Methods:** A retrospective cross-sectional study was conducted to establish a local DRL (LDRL) for a teaching hospital in Selangor. 355 adult coronary angiography data were retrieved, dated from January to December 2024. The KAP value generated by the system was recorded. The reference level is set at the 75th percentile value of the distribution, defining the value that should not be routinely exceeded in standard practice. **Results:** The study quantified an LDRL for adult coronary angiography of 2.88 mGy.m², which is lower than the national DRL of 5.44 mGy.m². **Conclusions:** The establishment of LDRL helped align the patient dose with the national guideline, upholding best practices and care of the patient.

Keywords: Air Kerma-Area Product (KAP), Diagnostic Reference Levels (DRLs), angiography, coronary arteriography.

ADD003

Accuracy Of Ibreast-Exam (IbE) in Detection of Breast Lesion

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Introduction: The Malaysia Cancer Registry Report 2017-2021 presented that breast cancer remains the most common cancer affecting Malaysians, with the incidence rate of 39% in females. A greater incidence rate of breast cancer is observed at the age of 40 to 74, the prime age at which a citizen should seek clinical breast examination. The report highlighted that 51% were diagnosed at late stages, urging the need for fast and accurate detection of breast abnormalities as an initiative to reduce mortality. Mammography is the gold standard of breast lesion detection, yet it is inaccessible in rural areas. iBreast-Exam (iBE) is a radiation-free, portable breast tumour detection device used to scan the breasts and visualise the variations of tissue density. The innovation aims to provide a reliable clinical breast examination tool, replacing the conventional palpation method. Therefore, this study was conducted to determine the accuracy of iBE in differentiating normal and abnormal breast tissue. **Methods:** A retrospective cross-sectional study was conducted involving 80 Sabahan women aged 40 years and above who underwent both iBE scan and mammography. The McNemar test was used to measure the sensitivity and specificity while the Receiver Operating Characteristics (ROC) is analysed to measure the accuracy of the diagnostic tests. **Results:** Upon investigation, iBE accurately identified 70 breast abnormalities with a sensitivity of 89% and specificity of 50% with mammography as the reference standard. **Conclusions:** iBE is a reliable complementary test for clinical breast examination to initiate more comprehensive breast imaging investigations.

Keywords: iBreast-Exam, handheld breast scanner, clinical breast examination

ADD004

Comparative Evaluation of Computed Tomography Severity Score and Quantitative Computed Tomography in Covid-19 Pneumonia Assessment

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Introduction: At the end of 2019, Coronavirus disease 2019 (COVID-19), caused by the novel SARS-CoV-2 virus, emerged as a global health crisis, prompting the urgent need for effective tools to assess disease severity. High-resolution computed tomography (HRCT) has played a pivotal role in evaluating pulmonary involvement, traditionally interpreted using the radiologist-dependent Computed Tomography Severity Score (CTSS). However, CTSS is subjective and time-consuming. Quantitative computed tomography (QCT), utilizing automated software, offers a faster and potentially more objective alternative. **Methodology:** This retrospective study was conducted at a Covid-19 centre in Klang Valley, on patients with confirmed category 4 or 5 COVID-19 who underwent HRCT between June 4 and September 30, 2021. **Results:** The relationship between CTSS and QCT was evaluated using Spearman's correlation coefficient, revealing a strong positive correlation. Cohen's Kappa demonstrated substantial agreement, reinforcing QCT's reliability. Statistical analysis using SPSS version 27.0 further examined associations with comorbidities and demographic factors. Diabetes showed a significant association with increased lung severity, while hypertension and heart disease did not. These findings suggest that QCT not only correlates well with CTSS but also enhances efficiency by providing quicker, consistent assessments of lung involvement. **Conclusions:** In pandemic conditions where rapid triaging is essential, QCT proves to be a valuable tool in clinical decision-making. Thus, QCT may serve as a reliable and efficient alternative to CTSS in evaluating lung severity among COVID-19 patients.

Keywords: Covid-19, quantitative computed tomography, Computed Tomography Severity Score, high-resolution computed tomography.

ADD005

Evaluating Magnetic Resonance Imaging Sequences for the Detection of Multiple Sclerosis Lesions

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Introduction: Multiple sclerosis (MS) is a chronic inflammatory demyelinating disease of the central nervous system (CNS), where early diagnosis is crucial for effective treatment. Magnetic resonance imaging (MRI) plays a key role in detecting inflammatory changes, and the use of advanced sequences such as Double Inversion Recovery (DIR), Short Tau Inversion Recovery (STIR), and Fluid-Attenuated Inversion Recovery (FLAIR) can enhance lesion detection, particularly in infratentorial and subcortical regions. **Methods:** This retrospective cross-sectional study evaluated the diagnostic performance of these sequences in 51 patients with relapsing-remitting MS (RRMS) at Ghazi Hariri Specialized Surgery Hospital, Iraq, between January and December 2019. Patients underwent MRI scans using axial DIR, STIR, and FLAIR sequences with 2 mm slice thickness. Signal intensities of MS lesions were measured and compared across sequences. Statistical analysis, including one-way ANOVA and Chi-square tests, were performed using SPSS version 20 to assess lesion load, sensitivity, specificity, and gender-based lesion prevalence. **Results:** Results revealed that DIR demonstrated significantly higher contrast ratios than both FLAIR and STIR ($p < 0.05$). DIR showed superior sensitivity and specificity in detecting infratentorial lesions (88% and 50%) and subcortical lesions (95% and 67%), respectively. Gender analysis indicated a higher prevalence of lesions in females, with DIR detecting the most pronounced differences. The findings underscore the diagnostic advantage of DIR over conventional sequences, particularly in regions often missed by standard protocols. **Conclusions:** In conclusion, the DIR sequence offers enhanced sensitivity for MS lesion detection and should be incorporated routinely in MRI protocols to improve diagnostic accuracy in MS, especially for infratentorial and subcortical plaques.

Keywords: multiple sclerosis, Double Inversion Recovery, magnetic resonance imaging, infratentorial and subcortical plaques.

ADD006

The Impact of Screen Time Usage Towards Academic Performance Among Medical Imaging Students in Public University

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Introduction: Students at universities now live almost entirely with smartphones, which have been used for everything. The prevalence of smartphone ownership among college students sparked curiosity about how using a smartphone affected every aspect of their lives, especially in their academic performance. This study investigates the relationship between screen time usage and academic performance among Medical Imaging students. **Methods:** This research used a cross-sectional study involving 115 students at UiTM Puncak Alam. The screentime questionnaire and academic performance scale (APS) were distributed through Google Forms and shared via online platforms. The questionnaire consists of three parts: demographic data, screen time questionnaire and academic performance scale (APS). **Results:** The Pearson's correlation test was used, and the statistical significance level was set at $P < .05$. There was a weak, negative correlation between the screen time usage and academic performance, $r = -.05$, $n = 115$, $p = .57$. Therefore, there is no sufficient evidence to conclude that there is a true linear relationship between variables in the population. **Conclusions:** Most of the university students are prone to have higher screen time, either for study purposes or social purposes. A smartphone can be a useful tool for balancing study and leisure time, which reduces study time and, however as a result, lowers marks for some students. This study shows that screen time usage is not the pure factor affecting academic performance, but it could provide a baseline data to assist for any intervention for screen time usage and academic performance.

Keywords: academic, performance, screentime

ADD007

Establishing Local Diagnostic Reference Level for Paediatric Fluoroscopic Examination in Micturating Cystourethrography

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Introduction: Micturating Cystourethrography (MCUG) is a common procedure performed in pediatrics. This procedure is associated with high radiation dose due to continuous screening to the patients. Therefore, dose optimisation is very important as their developing organs and tissues are more sensitive compared to an adult. However, Malaysia has not yet established the DRLs for MCUG procedure. **Methods:** In this retrospective study, a total of 93 samples data from patients' age of 5 years old and below were retrieved from March 2018 until March 2022 from a tertiary hospital in Kuala Lumpur. The group of patients were divided into two which are (< 1 year) old and between 1-5 years old. Dose value, Air Kerma-Area Product (KAP) was measured using a KAP meter build in fluoroscopy machine. Reference level is set at 75th percentile value and calculated for each group. An independent sample t-test was used, and the statistical significance level was set at $P < .05$. **Results:** The result is a statistically significant difference ($P = 0.012$) of KAP between the (< 1 year) old and the 1-5 years old. While, finding in fluoroscopic screening time shows there was no statistically significant difference ($P = 0.080$). The local diagnostic reference level (LDRL) for first age group (< 1 year) was 0.016 mGy. m^2 and shows 3 times lower than second age group (1 – 5 years), 0.040 mGy. m^2 . **Conclusions:** This study found that LDRL helped in the optimisation of radiation dose and enabled best practices by giving feedback to the healthcare professionals.

Keywords: Air Kerma-Area Product (KAP), Diagnostic Reference Levels (DRLs), fluoroscopy, micturating cystourethrography (MCUG), pediatric

ADD008

Evaluation Of Radiographers' Knowledge, Attitude and Practice (KAP) On The Radiation Protection During General Radiographic Procedures

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Introduction: Radiation protection is vital in radiologic practice to safeguard both patients and healthcare workers from the adverse effects of ionizing radiation. This study evaluated the knowledge, attitude, and practice (KAP) of radiation protection among radiographers in eight tertiary hospitals in Johor Bahru, Malaysia. **Methods:** A cross-sectional survey was conducted using a structured, self-administered questionnaire distributed to 78 radiographers. The questionnaire assessed socio-demographic data and respondents' KAP regarding radiation protection. **Results:** Results revealed that 97.4% of participants had high knowledge, 93.6% demonstrated a positive attitude, and 88.5% reported good practices related to radiation protection. However, knowledge gaps were noted in areas such as dose limits and unit measurements, and inconsistent use of protective equipment like lead gloves and goggles was observed. Significant associations were found between knowledge and religion ($p=0.041$), attitude and age ($p=0.046$), gender ($p=0.006$), education level ($p=0.022$), and training ($p=0.012$). Practice was significantly influenced by prior radiation hazard training ($p=0.014$). Correlation analysis showed a weak positive relationship between knowledge and attitude ($r=0.24$, $p=0.031$), as well as between attitude and practice ($r=0.25$, $p=0.029$), indicating that a more positive attitude correlates with better knowledge and safer practices. However, no significant correlation was found between knowledge and practice ($r=0.103$, $p=0.370$). **Conclusions:** In conclusion, while the overall KAP levels were satisfactory, targeted education and structured training are essential to address specific deficiencies. Incorporating radiation protection principles early in radiography curricula is recommended to reinforce safe practices and ensure long-term occupational safety.

Keywords: radiation protection, radiographers, radiation safety training

ADD009

Involvement And Perspectives on Research Activities Trend Among Radiographers at Tertiary Hospitals in Johor

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Introduction: Research is essential in advancing evidence-based practice in radiography. This cross-sectional study aimed to assess the involvement and perspectives of radiographers toward research activities in tertiary hospitals in Johor, Malaysia. **Methods:** A total of 145 radiographers participated in the study, with data collected via a structured questionnaire and analysed using SPSS Version 20. Most respondents were female (71.7%) and Diploma holders (61.4%), with the majority having less than five years of work experience. **Results:** Findings revealed that although 91.7% of radiographers agreed research is necessary for advancing radiographic practice, only 2.76% reported involvement in research projects. Respondents generally expressed positive perceptions, with over 80% agreeing that radiographers should lead or initiate research. However, actual research engagement was minimal. Key barriers identified were a lack of research culture in the workplace (80.6%), insufficient time during work hours (80.1%), and inadequate funding or support from colleagues and management. Conversely, factors that could promote research participation included organizational recognition (mean rank = 3.28), access to funding and resources (3.08), and support from supervisors and colleagues (3.01). Despite positive attitudes, the low engagement in research suggests a disconnect between perception and practice. Strengthening research culture, allocating dedicated time, and offering structured support and recognition may enhance radiographers' research participation. **Conclusions:** These findings provide insight for policy-makers and healthcare leaders aiming to integrate research into clinical radiography and foster a culture of inquiry within diagnostic imaging departments.

Keywords: evidence-based practice, radiography research, research engagement, research barriers

ADD010

Knowledge of Nosocomial Infection and Practice of Infection Control among Medical Imaging Students in Three Malaysian Public Universities During Their Clinical Practice

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Introduction: Nosocomial infections (NI) present a critical challenge in healthcare settings, particularly within radiology departments. This cross-sectional study aimed to assess the knowledge and infection control practices among 235 medical imaging students from three Malaysian public universities (UiTM, UniSZA, and UKM) during their clinical placements. **Methods:** Over the course of three months, from April to June 2023, data were gathered from 235 medical imaging students using a cross-sectional survey approach. A structured questionnaire with 45 items that were modified from validated instruments was used in the investigation. **Results:** The findings showed a high degree of infection control practice (mean = 3.87) and knowledge (mean = 3.79). Knowledge and practice showed a weak but statistically significant positive connection ($r = 0.34$, $p = 0.001$). Knowledge gaps were identified in areas like hand hygiene without obvious contamination and the dangers of wearing jewelry or clothing outside of clinical settings, despite the generally good ratings. Lower adherence to procedures such as cleaning X-ray equipment and rubbing hands before providing patient treatment was also noted. According to the study, students' compliance with infection control procedures was also greatly influenced by peer pressure, clinical demonstrations, formal instruction, and staff observation. **Conclusions:** These results highlight how crucial it is to incorporate thorough infection control instruction within the curriculum for medical imaging. To strengthen proper practices and fill in current knowledge gaps, practical, simulation-based learning and ongoing professional development are advised. The results highlight the necessity of focused educational initiatives and practical instruction to enhance infection control practices for aspiring radiologists.

Keywords: nosocomial infection, infection control practice, medical imaging students, clinical practice

ADD011

Local Diagnostic Reference Levels for Paediatric CT Brain

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Introduction: High radiation doses from Computed Tomography (CT) scans are the major concern for paediatric patients as they are more susceptible to radiation risk. Hence, diagnostic reference level (DRL) has been implemented to revise CT dose optimization. This study is aimed to determine local DRL of paediatric patients undergoing CT brain examination and compare the proposed DRL with the previously established reports. **Methods:** A total of 164 paediatric patients undergoing CT brain examination were retrospectively reviewed and categorized into five age groups: 0-2 years (Group 1), 3-5 years (Group 2), 6-12 years (Group 3), 13-16 years (Group 4), and 17-18 years (Group 5). CT dose index volume (CTDI_{vol}), dose length product (DLP) and effective dose (ED) were calculated for the third quartile to establish the local DRL. The DRLs were compared with the previously established DRL reports. **Results:** The results demonstrated DRL values ranged from 29.9 mGy - 59.4 mGy, 453.6 mGy.cm – 1051.3 mGy.cm, and 1.7 mSv – 3.9 mSv for CTDI_{vol}, DLP and ED. The doses were significantly varied among the age groups ($p < 0.001$). The present DRL was found to be higher than most of the other published DRLs in paediatric CT brains. **Conclusions:** The established DRL indicates dose variance in age groups among paediatric patients and higher than the established DRL reports in paediatric CT brain examination. The current CT brain protocol and practice should be reviewed to achieve dose optimization in paediatric CT.

Keywords: CT brain, diagnostic reference level, paediatric