



JAMSA
Journal of Asian Medical Students' Association



Journal of Asian Medical Students' Association

Abstract Book

Asian Medical Students' Conference (AMSC) 2024

Disaster Medicine

Japan, 21-27 July 2024





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Editorial Page

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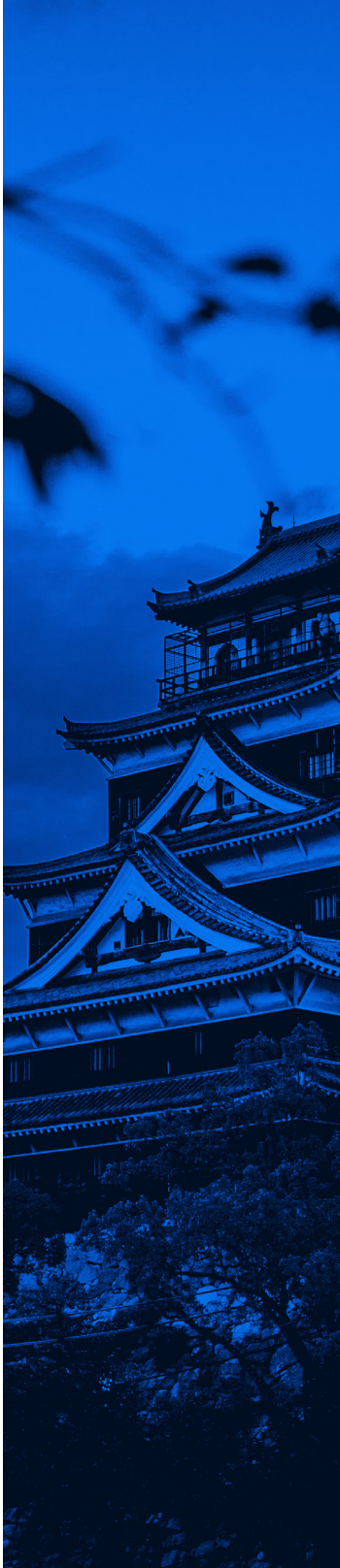
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About AMSC 2024



The 45th Asian Medical Students' Conference (AMSC) was held in Tokyo, Japan from July 21st to 27th, 2024, with the theme of Disaster Medicine. This chosen theme is particularly pertinent amidst the heightened frequency and severity of natural disasters globally, exacerbated by the enduring challenges posed by the ongoing COVID-19 pandemic. Recent geopolitical events, including the Myanmar coup and the Israel-Gaza conflict, further underscore the increasingly intricate nature of crises and their profound societal ramifications. These issues transcend national boundaries, emphasizing the critical necessity for efficacious health emergency and disaster crisis management strategies. Drawing on Japan's extensive experience in managing natural disasters, the conference seeks to furnish invaluable insights and cultivate international collaboration across the Asia-Pacific region.

Disasters represent sudden events with far-reaching impacts on communities, particularly on healthcare systems. Japan, notably, has endured numerous natural calamities, such as the 2011 Tohoku Earthquake and Tsunami, the 1923 Great Kanto Earthquake, and the 1828 Siebold Typhoon. However, disasters are progressively intensifying in frequency and potency on a global scale, imposing substantial burdens on healthcare infrastructures, as exemplified by the recent global COVID-19 pandemic.

Disaster Medicine encompasses the study and management of major incidents and disasters, aiming to prepare for and mitigate such scenarios proactively. Consequently, the objectives of the conference encompass exploring responses to disasters at personal, local, national, and global levels; examining the morbidity, mortality, public health impacts, and mental health repercussions of disasters; and scrutinizing healthcare management strategies during crises. Through these articulated objectives, AMSC 2024 endeavors to serve as a platform for raising awareness, deliberating on pertinent issues, and exploring viable solutions, equipping future medical practitioners to confront the unpredictability inherent in disaster scenarios.

Foreword

Chief Editor of JAMSA



Rifkanisa Nur Faiza

Chief Editor
of JAMSA 2023/2024

Dear Readers,

Time has flown by during my tenure as Chief Editor of the Journal of Asian Medical Students' Association (JAMSA), alongside the dedicated JAMSA board who have worked tirelessly during this period. Thus, I am delighted to present the final abstract book of the tenure for the Asian Medical Students' Conference (AMSC) 2024 with the theme "Disaster Medicine" hosted by AMSA Japan. This conference serves as a remarkable platform for medical students and young professionals across the Asia-Pacific region and beyond to exchange knowledge in research.

This book showcases the dedication of our young medical students to advancing disaster medicine, a field crucial in our unpredictable world. Effective disaster medicine not only responds to crises but also enhances community preparedness, resilience, and recovery, saving lives and reducing suffering.

Each abstract highlights a commitment to improving community resilience in times of crisis. The significance of disaster medicine includes developing rapid response systems, effective communication strategies, and comprehensive emergency preparedness plans, ensuring robust healthcare systems.

I extend my deepest gratitude to the authors, reviewers, and contributors who made this publication possible. I encourage all AMSC participants to engage, exchange ideas, and build lasting connections. Together, we can pave the way for a more resilient and prepared future, embodying the role of physician-scientists ready to tackle tomorrow's challenges.

Thank you for your attention. Viva AMSA!

Foreword

Head of Conference AMSC 2024



Van Tai Nguyen

Head of Conference
AMSC 2024 Japan

Greetings, People of Tomorrow!

First and foremost, I extend my heartfelt gratitude to all participants who have graciously submitted their abstracts to us. Your dedication and effort are the cornerstone of our conference's success.

The theme for this year's conference focuses on Disaster Medicine, an exceptionally significant subject considering the increasing frequency and severity of natural disasters. This urgency is further compounded by the ongoing challenges posed by the global COVID-19 pandemic, as well as ongoing humanitarian crisis like the coup in Myanmar and the Israel-Gaza conflict. These issues extend beyond national boundaries, emphasizing the critical importance of efficient health emergency and disaster crisis management. Drawing upon Japan's rich experience in addressing natural disasters, we aim to provide valuable insights about the field during the conference and encourage international collaboration within the Asia-Pacific region.

I would also like to extend special thanks to the AMSA International Academic Department and JAMSA for their invaluable assistance in organizing the Academic competition.

It is my sincere hope that AMSC2024 will serve as a platform for us to unite, exchange ideas, and mutually inspire one another. Let us seize this opportunity to enhance the research landscape in Asia and foster even greater collaboration and innovation in the future.

Viva AMSA

Foreword

Head of AMSC 2024



Hina Kawaji

Head of AMSC 2024 Japan

Greetings, People of Tomorrow!

It is a great honour to present the abstract book for the Asian Medical Students' Conference (AMSC) 2024 Japan.

This year, our focus has centred on the vital field of disaster medicine. With the escalating frequency and diverse nature of disasters, along with the ongoing global emphasis on environmental concerns and the pursuit of SDG targets for 2025, the need for effective disaster preparedness and response has never been more pressing. We believe AMSC, where medical students from around the world come together, exchange ideas, and collaborate, will enable us to contemplate and address the challenges all countries face now and will continue to face in the future.

Under the overarching theme of Disaster Medicine, we have set four sub-themes:

- Prevalent health conditions in disaster medicine
- Management during emergencies
- The impact of disasters on populations and public health involvement during disasters
- Novel technology integration into disaster medicine

By exploring these areas, we aim to provide a comprehensive understanding of the multifaceted nature of disaster medicine. This includes the immediate clinical response to disasters, the broader public health strategies that can mitigate their impact, and the cutting-edge technologies that can revolutionise our approach to disaster preparedness and response.

I sincerely hope this conference has helped all participants enhance their knowledge and motivation for further research. The exchange of ideas and insights during the conference is invaluable, fostering a collaborative spirit that drives innovation and progress in the field of disaster medicine. The connections made and the knowledge shared here will undoubtedly contribute to better preparedness and response strategies in the face of future disasters.

Lastly, I extend my heartfelt thanks to everyone involved in organising AMSC, the academic competition, and the publication of this book. Your hard work and dedication have made this possible, and I deeply appreciate your continued cooperation and support in the future. Let us continue to work together to ensure a safer and healthier world for all.

VIVA AMSA!



Scientific Paper

The Efficacy of Ketamine as an Alternative and Adjunct to Morphine for Acute Pain Control in the Emergency Department: A Systematic Review and Meta-Analysis

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Introduction

Over half of visits to emergency departments involve acute pain, which is primarily treated with opioids. However, the risk of misuse and rising incidences of opioid tolerance underscore the need for alternatives. Ketamine has emerged as a preferred analgesic to reduce opioid use, necessitating the development of guidelines for application. This study aims to evaluate the effectiveness and safety of ketamine for acute pain management compared to morphine, and to assess its benefits as an adjunct to standard morphine therapy.

Objective

This study aims to evaluate the effectiveness and safety of ketamine for acute pain management compared to morphine, and to assess its benefits as an adjunct to standard morphine therapy.

Method

Searches on Pubmed Central and EMBASE databases up to March 2024 identified 1287 studies, after duplicates were removed. Reviewers completed paired screening yielding 14 relevant studies, and appraised the risk of bias using the Cochrane tool. A meta-analysis was then carried out using a random-effects model with inverse variance weighting.

Result

The analysis of pain scores, measured on the numeric rating scale (NRS), showed no significant difference in pain reduction between ketamine and morphine (Mean Difference = 0.1618, 95% Confidence Interval (CI) -0.0793 to 0.4029). Ketamine use resulted in a higher incidence of adverse drug reactions (ADR) compared to controls (Risk Ratio = 1.47, 95% CI 0.82 to 2.64). However, all four studies that examined ketamine as an adjunct to morphine reported improvements in pain reduction and reduced opioid usage, albeit with increased minor side effects like nystagmus and dizziness.

Conclusion

Ketamine showed better analgesic performance compared to morphine at the 15 and 30-minute marks, but did not exhibit significant advantages overall. As an adjunct, ketamine's greater efficacy highlights its utility in supplementing analgesia and consequently reducing opioid usage. Although increased short-term ADRs were noted in ketamine use, further research into its long-term effects is necessary to allow for a more robust and comprehensive analysis of its role in acute pain management.

Keyword

ketamine, morphine, acute pain, emergency department, opioid

Does Benzo[a]pyrene Exposure Affect Academic Performance Among Schoolchildren?

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Introduction

The air pollution is a significant public health problem, with especially appalling consequences apparent in Asia, and has reached catastrophic levels in Mongolia. Among the pollutants comprising environmental air pollution, we focused on the examination of carcinogenic polycyclic aromatic, benzo[a]pyrene (BaP), a toxic compound emitted from the combustion of fossil fuels such as coal, wood, and diesel. In the human body, BaP breaks down into transbenzo[a]pyrene-7,8-diol-9,10-epoxide (BPDE) compounds, disreputable for their propensity to induce DNA damage. In recent years, BaP's neurotoxic effects are increasingly being investigated. Our study aimed to investigate the impact of BPDE exposure level on certain schooling outcomes of children.

Method

We conducted a cross-sectional study among pre-adolescent [1] [2] t children in Ulaanbaatar. Participants were randomly selected from 7th, 8th graders of two schools located in regions characterized by hazardous sites (301-500 AQI) (n=42) and sites that are unhealthy for sensitive groups (101-150 AQI) (n=33). We collected data from participants by questionnaires and collected blood samples for BaP exposure measurements. In order to assess academic performance, the average grade across all grades for the academic year was retrieved using ordinal grades (A-F) and percentage scores. The blood samples were analyzed to quantify the levels of BPDE-DNA adducts. Chi-square test and spearman rank correlation using IBM-SPSS 26.0. A local IRB approval was granted and we adhered to the Declaration of Helsinki throughout the study.

Result

The average age of the children participating in the study was 12.2±0.6, and 53.3% were males and 46.7% females. 9.3% of all students had [3] [4] [5] [6] [7] [8] [9] A, 33.3% B, 38.7% C, and 13.3% D, and there was no difference between the 2 schools. Based on BPDE-DNA levels in the blood, 20.0% of participants with low exposure (<1.4*10⁻³ng/mL), 54.7% with moderate exposure (1.5*10⁻³-6.5*10⁻³ng/mL), and 25.3% with high exposure (>6.6*10⁻³ng/mL) in Q1 and Q3 percentiles. Blood BPDE-DNA was higher in children studying in areas with high air pollution (38.1%) than in areas with medium pollution (9.1%, p<0.001). Children with high exposure were more likely to live in traditional homes and houses and use coal for fuel (p<0.001). We did not observe a significant relationship between students' academic achievement and blood BPDE-DNA (r=-0.07, p>0.05) levels.

Conclusion

In our study, no effect of benzo[a]pyrene exposure on students' academic achievement was observed.

Keyword

air pollution, child health, education, population health, chemical hazard

Comparing Virtual Reality Simulation Outcomes in Disaster Medicine: A Systematic Review and Guideline for Future Application

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Introduction

Disaster medicine (DM) is a discipline encompassing emergency medicine and disaster management. It focuses on reducing the burden on public health through disaster mitigation, preparedness, response and recovery efforts. Novel technologies like Virtual Reality simulation (VRS) are increasingly used to enhance medical training and response. Different outcome measures, such as the translation of learned content to application, the development of technical and non-technical skills, and the cost of VRS are evaluated in studies involving VR use in DM scenarios.

Objective

This review aims to evaluate outcomes of VR use versus controls in various DM scenarios, and offer recommendations for how VR can be best integrated in the teaching, training, and assessment of healthcare professionals in disaster medicine.

Method

Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline, 421 articles from 2019 to present were identified from PubMed, OVID, Google Scholar, and SCOPUS databases using the search terms "virtual reality" and "disaster medicine". COVIDENCE was used to exclude duplicate or ineligible papers, and completed paired screening of 191 abstracts and 50 full texts was performed according to the defined eligibility criteria. 19 studies were then analysed and categorised by scenario type and outcome measure.

Result

Comparing VRS outcome measures to a control group, statistical significance was demonstrated in cost-effectiveness and improving technical skills such as triage accuracy, performance, and time taken to complete a specified skill. Other outcomes, such as immersiveness and development of non-technical skills, including decision making and clinical reasoning, showed that VRS had no significant advantage compared to non-VRS methods.

Conclusion

Given VR's varied impact on different domains, we recommend its targeted integration into DM training programs aimed at enhancing technical skills. However, traditional methods should still be employed alongside VRS to cultivate non-technical skills, ensuring a balanced and effective training regimen that optimises resource utilisation and overall efficacy.

Keyword

virtual reality, disaster medicine, simulation

Optimizing Fluid Resuscitation Strategies: A Network Meta-Analysis Of Effectiveness and Safety for Hemorrhagic Shock-Related Patients On Emergency and Disaster Settings

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Introduction

Massive natural disasters impact over 185 million people globally, highlighting the critical role of disaster medicine in life-threatening conditions, especially hemorrhagic shock. Current European guidelines noted a lack of definitive evidence favoring one fluid type over another in resuscitation process. Hence, this study aims to explore the effectiveness and safety of proposing recommendations for their optimal use in emergency and disaster settings.

Method

This network meta-analysis was conducted based on the PRISMA-NMA Checklist of Items. A systematic search was conducted in PubMed, CENTRAL, Scopus, Web of Science, ProQuest, and CINAHL up to January 3, 2024 (PROSPERO CRD42024516480). Data analyses were performed using Rstudio v.4.3.1, MetaInsight v.5.2, CINeMA, and GeMTC in both Frequentist and Bayesian NMA with DerSimonian-Laird random-effects model. SUCRA values were present the ranking of each treatment in the network, and confidence of each comparison was assessed using GRADE approach. Safety aspects were analyzed using meta-proportions with GLMM models.

Result

A total of 36,432 patients from 62 randomized controlled trials were included in this study. Natural colloid demonstrates the lowest mortality rate (OR=0.69; 95%CI 0.48 to 0.99; SUCRA 84.78) and superior in improving hemodynamic outcomes, including heart rate (MD=1.75; -5.82 to 2.31; 69.85) and central venous pressure (MD=1.63; 0.08 to 3.18; 80.88). Regarding the perfusion markers, plasma and albumin proved to be the best at maintaining the body's hemoglobin levels (MD=1.5; -2.31 to 5.31; 71.48), bicarbonate levels (MD=4; -1.23 to 9.23; 79.75), and pH (MD=0.05; -0.05 to 0.14; 82.66). Meta-proportions demonstrate distinct levels of caution for each type of fluid. All graphical and tabular data can be accessed through <https://github.com/NMA-on-Hemorrhagic-shock>.

Conclusion

This study provides robust evidence favoring the initial use of natural colloids in the management of patients with hemorrhagic shock. Nonetheless, it is imperative to consider the cost implications, accessibility, and clinical suitability inherent to each fluid.

Keyword

colloid, crystalloid, disaster, hemorrhagic shock, resuscitation

Assessing the Effectiveness of Comparative Psychological Interventions for Post-Traumatic Stress Disorder Patients Following Disasters: A Bayesian Network Analysis

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Introduction

Post-traumatic stress disorder (PTSD) is a prevalent mental health condition among individuals affected by natural and man-made disasters. Our study aims to assess the comparison of effectiveness psychological interventions for post-disaster PTSD, providing insights crucial for evidence-based decision-making in clinical practice and disaster response efforts.

Method

A systematic search of the Scopus, PubMed, and Embase databases was conducted to identify randomized controlled trials comparing the effectiveness of psychological interventions with corresponding standardized mean differences (SMD) for post-disaster PTSD, from inception to 15 March 2024. Pairwise meta-analysis was performed to estimate SMD using random effects models. Frequentist network meta-analysis was employed to integrate direct and indirect evidence and rank interventions based on their efficacy. Sensitivity and subgroup analyses were conducted.

Result

Eighty-four randomized controlled trials meeting inclusion criteria involved 10,428 participants across diverse disaster settings. A pairwise meta-analysis revealed significant findings, indicating that cognitive behavioral therapy (CBT) consistently reduces PTSD symptoms more effectively than control treatments [SMD -0.67 ; 95% CI -1.20,-0.15 ; p<0.01]. The sensitivity analysis confirmed the robustness of effect sizes across studies. Additionally, subgroup analysis by disaster type indicated that man-made disasters could reduce PTSD symptoms. According to the Surface Under the Cumulative Ranking Curve (SUCRA), short-term CBT was the highest effective treatment for PTSD symptoms (SUCRA = 0.9586), as determined by Bayesian network meta-analysis, followed by thought field therapy (SUCRA = 0.9315) and single-session behavioral therapy (SUCRA = 0.9125).

Conclusion

Our study suggests that short-term CBT is the best method for treating post-disaster PTSD patients, but alternative treatments are also suggested. Clinicians should weigh these findings in patient care decisions to optimize mental health support for disaster-affected populations. Additionally, Public health should prioritize evidence-based CBT for community resilience against PTSD, integrating findings into treatment guidelines and disaster response especially man-made disasters.

Keyword

disaster, post-traumatic stress disorder, psychological interventions

Assessing Cerebellar Pathophysiology in Post-Traumatic Stress Disorder: A Scoping Review

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Introduction

Disaster survivors do not always survive from trauma, which can create neurobiological changes and trigger psychiatric symptoms, as well as post-traumatic stress disorder (PTSD). A growing body of brain magnetic resonance imaging (MRI) studies has examined the role of the cerebellum in PTSD, as it comprises 80% of brain grey matter with rich anatomical connections to regions processing emotion and cognition. Our study aims to assess which specific subregions of the cerebellum are involved in the pathophysiology of PTSD by reviewing brain MRI studies.

Method

Following Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR), we conducted a literature search across PubMed, MEDLINE, and EMBASE, identifying structural and functional MRI articles published in the past 20 years. After screening, 40 relevant articles were reviewed. These included studies focus on cerebellum by identifying changes in the volume, as well as activity and functional connectivity in task-based and resting-state functional MRI (fMRI).

Result

While the results of structural alterations of the cerebellum mixed, the majority of studies reported a reduction of cerebellar volume, particularly in the posterior left cerebellum and the vermis. These anatomical results are consistent with regions in the primary findings from functional alterations. Task-based fMRI studies showed rising activity in posterior left cerebellum and vermis but with reduction in follow-up. In resting-state fMRI, lower functional connectivity between posterior left cerebellum default mode network (DMN) areas which regulate cognitive functions related to self-awareness and memory was found.

Conclusion

Our studies showed both structural and functional changes are mainly in the posterior left cerebellum in PTSD patients. Based on these notable findings in cerebellar with PTSD, we aim to establish a basis for future studies to investigate the causal relationship for diagnosis tool and further follow-up.

Keyword

PTSD, structural change, functional change, fMRI

Mapping Disaster Preparedness: An In-Depth Analysis Into Hong Kong Residents' Responses via Artificial Neural Networks

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Introduction

Enhancing preparedness for effective response and recovery is one of the four key priorities of the Sendai Framework for Disaster Risk Reduction 2015–2030. Identifying factors associated with disaster preparedness behaviors in the population is crucial in determining how to allocate limited resources in strengthening community preparedness. However, demographic characteristics associated with preparedness behaviors still remain unclear in Hong Kong and these factors might have complex relations with such behaviors. Artificial neural network (ANN) enables non-linear modeling and might help reveal such factors. We aimed to identify factors associated with preparedness behaviors using ANN analysis.

Method

We performed a secondary analysis of the survey data on 1,023 Hong Kong residents collected from 516 random GPS locations across the city[1]. The survey assessed various aspects of disaster preparedness, including demographic characteristics, self-efficacy and preparedness behaviors etc. The primary outcome of this study was a lack of disaster preparedness of the respondents, defined as a lack of both emergency contact number and an evacuation kit. We performed a random 70/30 data split and supervised ANN machine learning. The discriminatory performance of the trained model was evaluated in the testing dataset using the area under the receiver operating characteristic curve (AUROC).

Result

An ANN model with one hidden layer and 5 hidden nodes was trained based on eight variables: age, gender, geographical district, poverty status, living-alone status, self-efficacy, first aid and disaster knowledge. The model had an AUROC of 0.748 and accuracy of 80.5% in identifying residents with a lack of preparedness behaviors, with district, age, and self efficacy being the three most important factors.

Conclusion

ANN offers a new method to identify unprepared groups in the population. More preparedness efforts should be targeted to certain districts in Hong Kong, elderly residents and those with a lack of first-aid knowledge.

Keyword

artificial neural networks, disaster preparedness, gps spatial sampling

Disasters' Effect Towards Victims' Psychological Welfare: Data From a Large National-Scale Survey in Indonesia

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Introduction

Indonesia is a disaster-prone country due to its geographical conditions, and it ranks second among 193 countries in disaster risk. Enduring many disasters, the Indonesians have suffered significantly. This study aims to examine the association between disaster events and depression in Indonesia.

Method

Data were obtained from the Indonesian Family Life Survey 5 (IFLS-5) in 2014/2015. Depression was assessed using the ten items from the Center for Epidemiologic Studies Depression Scale Revised (CESD-R-10). Bivariate and multivariate analyses were performed using logistic regression to determine correlations among variables.

Result

From 31,447 total samples obtained in this study, we found that 23.2% had experienced depression. Our findings further showed that having experienced a disaster event is significantly associated with having depression symptoms. The associations remained when the covariates were included in the analyses.

Discussion

Disasters, except volcanic eruption, were related to a higher risk of being depressed in Indonesia. We found that women and those aged 19 – 59 years are more prone towards depression regardless of experiencing disasters, while higher education levels reduce the risk of depression. No geographical area gives any distinguishing psychological relief related to disasters. However, it is important to acknowledge that this study was a cross-sectional study, therefore it cannot establish the root cause of depression in the disaster events. Furthermore, there might be a potential recall bias in self-reported data that needs to be considered.

Conclusion

This study indicates that disaster survivors often experience depression, which may also be influenced by factors such as age, education, sex, and region in Indonesia. Consequently, there is a pressing need to enhance post-disaster psychological care through psychiatric consultations, medications, and support groups.

Keyword

disasters, depression, disaster medicine, mental health, psychology



Scientific Poster

Designing Culturally Tailored Particulate Matter 2.5 (PM2.5) Pollution Warning Messages: A Study Among Thai University Students

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Introduction

Wildfires are a prevalent disaster that can occur in many countries. In northern Thailand, wildfires have significantly contributed to PM2.5 air pollution for decades, posing substantial health risks. Utilizing mobile messaging services to notify the public about PM2.5 threats has become imperative for safeguarding public health. However, enhancing the effectiveness of warning messages to raise awareness about pollution remains crucial. This study aims to explore the potential of designing warning messages for PM2.5 pollution that surpass the existing style and content utilized by public alert agencies.

Method

This cross-sectional study employed a self-administered online questionnaire via REDcap. Various PM2.5 messages differing in length (short, revised, standard, and sequence) and content (understanding, decision-making, and feeling) were tested for their impact. Descriptive statistics were utilized for analysis.

Result

A total of 162 university students participated, with 58.6% being female. The mean age was 20.7 years old (SD 3.1). A significant majority (96.5%) had a history of exposure to serious PM2.5 pollution, with 81% reporting its daily impact on their lives. However, only 27.8% had experienced mobile alerts. The most preferred message format is the sequenced message (32.1%), followed by the short (29.0%), revised (26.5%), and standard (12.4%) messages. After exposure to the sequence message, 72.8% experienced fear, yet over 90% understood the situation, recognized health risks, and felt empowered to make decisions to protect themselves from PM2.5 pollution.

Conclusion

The majority of university students favor the sequence message format, which provides sufficient information about the threat of PM2.5 pollution. A series of short messages may also serve as viable alternatives for effectively communicating warnings. These findings underscore the importance of tailoring warning messages to address the health risks associated with PM2.5 pollution effectively.

Keyword

air pollution (PM2.5), wildfire, warning message, university student, thailand

Innovative Artificial intelligence Solutions for Enhanced Tuberculosis Diagnosis Following Disaster: Retrospective study of AI Chest X-ray Analysis versus Expert Evaluation

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Introduction

During natural and human-made disasters, limited healthcare access raises TB incidence, especially in developing countries. Untreated TB leads to severe complications and increased mortality. Artificial intelligence (AI) offers innovative solutions for TB diagnosis. In Mongolia, AI-based chest X-ray analysis aids rapid TB detection, which is crucial during emergencies. This study evaluates AI's effectiveness in diagnosing TB during disasters. Evaluating AI's reliability in TB diagnosis emphasizes the importance of tech advances in crisis TB prevention.

Method

From 2000 patients' CXR from the National Center for Communicable Diseases database, we randomly selected 18 TB-positive images, 41 abnormal images (excluding TB), and 41 normal images as a control group. We used the VUNO Med-chest X-ray AI system to diagnose TB based on 5 major abnormalities: Nodule, Consolidation, Interstitial Opacity, Pleural Effusion and Pneumothorax and compared them with 2 experienced (>10 years) radiology and pulmonology doctors' evaluations. In the IBM-SPSS29 program, we conducted Cohen's kappa test, logistic regression, and ROC curve analysis to evaluate statistical significance.

Result

Among 100 patients, 58 males and 42 females, the average of the participants was 28.9 year-old adults. For AI TB diagnosis, both nodules and consolidation were found to be statistically significant predictors ($p < 0.05$). Similarly, in radiology assessments, nodules and pleural effusion exhibited significant predictive value. The AI-assisted chest X-rays, highly suggestive of tuberculosis on radiologist assessment, showed a sensitivity of 76.3% and the highest specificity of 91.9%. Comparing TB diagnosis methods, AI exhibited a robust AUC of 0.813, signifying strong discriminative ability. Pulmonologists showed a lower AUC of 0.523, indicating comparatively poorer discriminative ability in distinguishing individuals with and without tuberculosis.

Conclusion

The AI-based software successfully detected all TB patients. Our analysis showed the significant potential of AI for TB diagnosis after disaster scenarios, with promising results compared to traditional methods.

Keyword

artificial intelligence, tuberculosis, sensitivity, specificity, post-disasters

Ensuring Children's Health Rights Amidst Armed Conflicts: A Review of Malnutrition and Utilization of Innovative Technological Approaches in Humanitarian Assistance

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Introduction

Armed conflicts have widespread consequences on vulnerable populations, particularly children, with malnutrition being a significant yet often overlooked outcome. The extent of its impact, ranging from reversible to irreversible, depends on variables such as chronic and acute malnutrition. Despite widespread recognition of this crisis, effective interventions still need to be discovered, necessitating reevaluating traditional approaches, and exploring innovative solutions.

Objective

This narrative review aims to explore the intricate relationship between armed conflicts and childhood malnutrition, examining the diverse challenges in humanitarian aid. Additionally, it seeks to evaluate the potential usage of technological innovations in mitigating the impact of malnutrition, thereby safeguarding children's right to health in adversity.

Method

The narrative review utilized Boolean operators and specific keywords like "children malnutrition," "armed conflicts," "humanitarian aid," "NutriPhone," "telemedicine," and "drone" to systematically search databases and reputable news sources. This search aimed to identify literature on randomized research conducted between 2019 and 2024.

Result

The review highlights that armed conflicts profoundly disrupt a population's political, economic, and social structures, leading to household food insecurity, inadequate childcare, unhealthy living conditions, and limited access to health services. These contribute to insufficient dietary intake and poor health status, resulting in malnutrition. Additionally, the review identifies barriers to humanitarian aid efforts, including risks to personnel and logistical challenges due to armed restrictions. To mitigate these challenges, the study suggests leveraging emerging technologies such as NutriPhone diagnostics systems, telemedicine consultations, and drone-assisted aid for delivery in addressing malnutrition effectively.

Conclusion

Childhood malnutrition in conflict zones presents a complex challenge, exacerbated by disrupted services and heightened vulnerabilities. However, advancements in technology offer promising avenues for more effective humanitarian aid delivery.

Keyword

children, malnutrition, armed conflict, humanitarian aid, barriers

Impact of Gas Explosions in Mongolia: A Mixed-Method Study

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Introduction

The most significant disaster in recent Mongolian history occurred in January 2024 following a gas explosion in the capital city. Such catastrophic events can inflict both direct and indirect psychological damage on the affected populations, with enduring negative psychosocial consequences that impact mental health and quality of life.

Method

One month post-incident, a mixed-methods approach was employed involving random sampling of affected individuals. Data collection included questionnaires, in-depth interviews, and content analysis.

Result

The study involved participants with an average age of 29±13 years, 62.7% (n=160 total number of cases) of whom were female. Over half (55%) exhibited symptoms related to psychological acute stress exposure, and 40% were found to have a strong immunosuppressive effect. Exposure to a traumatic event is strongly linked to adverse physical health. Among victims affected directly, 41% were exposed to physical symptoms, and 88% demonstrated increased restlessness, anger, irritability and insomnia. Children showed a significant fear of semi-trucks (semiochlophobia). The mental health outcomes of victims varied with their proximity to the explosion, with those closer experiencing higher rates of severe depression and anxiety. However, no significant differences were found in overall quality of life and insomnia rates. Qualitative findings revealed financial stresses, such as mortgages and business loans, compounding the psychological impacts. Online content analysis showed that accident-related information garnered significant public attention and often carried an alarming tone.

Conclusion

The gas explosion induced significant psychological distress manifested as anxiety and depression among the affected individuals. While these impacts are profound, the study found no conclusive evidence of mid-term detrimental effects on overall quality of life, suggesting the absence of enduring post-traumatic conditions. The findings underscore an urgent need for targeted psychological interventions to address mental health disturbances following such disasters.

Keyword

gas explosion, psychological impact, PTSD, mental wellbeing, quality of life

Mesenchymal Stem Cell Derived Exosome-Mediated Schwann Cell Proliferation: Implications for Crush Injury Nerve Regeneration: A Systematic Review

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Introduction

Crush-induced peripheral nerve damage is one of the leading causes of long term disability in disaster medicine, disability which is only exacerbated by limited effective nerve regeneration strategies. Recent findings support the use of exosomes to enhance Schwann Cell (SC) proliferation, a critical aspect in the multifaceted process of nerve regeneration. Despite numerous reviews exploring mechanisms and trends, statistical analyses remain scarce. Thus, this systematic review aims to evaluate the effects of mesenchymal stem cell derived exosomes (MSCD-Exo) on peripheral nerve regeneration.

Method

Pubmed, Ovid and Embase were searched for full-text, English-language studies until April, 2024. Titles and abstracts, followed by full-text screening were performed by three independent reviewers searching for laboratory-based studies measuring the effect of MSCD-Exo on SC proliferation and nerve regeneration. Data extraction was carried out by three independent reviewers. Standardized mean differences (SMD) were calculated from extracted data using R statistical packages, and aggregated using a random effects model. Assessment of risk of bias and publication bias was completed.

Result

From 446 results, 8 studies met the inclusion criteria. This quantitative analysis showed that using MSCD-Exo had a positive, albeit non-significant, effect on peripheral nerve repair (SMD 1.38; 95% Confidence Interval: -.54, 4.29). Despite the I² value representing considerable heterogeneity at 84% ($p < 0.01$), the intervention group exhibited greater SC proliferation, myelinated axon density and myelin sheath thickness compared to the control group in animal models.

Conclusion

MSCD-Exo can potentially improve therapeutic management of peripheral nerve damage, especially in the setting of mass casualty incidents. However, the validity and reliability of these results were impacted by a lack of studies, limited sample sizes and significant inter-study heterogeneity. Further investigation into human application and safety is recommended for more conclusive evidence.

Keyword

exosomes, schwann cells, crush injury

Leveling up Triage Accuracy: A Comprehensive Randomized Controlled Trials Meta-Analysis of Game-Based Training Effects on Healthcare Worker's Disaster Triage Skills

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Introduction

Disaster strikes with a devastating burden, causing up to 62,000 deaths in 2023 worldwide. This revealed limited triage skills among healthcare workers, with up to 70% of severely injured patients being undertriaged, increasing the risk of death. Even so, conventional training methods for reducing undertriage are proven ineffective, prompting the need for innovative training for enhancing the triage accuracy, game-based training shines as a promising approach. However, evidence on game-based training effectiveness remains uncertain. Thus, we would like to analyze game-based impact compared with conventional training on enhancing triage accuracy in health workers for optimizing their pivotal role in disaster response.

Method

This study followed the PRISMA guidelines. Study searches were conducted through eight databases until March 5th, 2024. Statistical analysis was done with Review Manager 5.4.1 and risk of bias was assessed using Cochrane RoB 2.0 tool. Effect size uses Mean Difference (MD) with 95% Confidence Interval (CI). Random or fixed effect models were used based on the level of heterogeneity and were considered significant if $p < 0.05$.

Result

Four RCTs were analyzed quantitatively, with a total of 767 healthcare workers assessed using game-based training as the intervention and conventional education as the control. All video games are simulation games where the health workers have to conclude the type of triage. Our study found that game-based training significantly decreases healthcare workers undertriage (odds ratio [OR]=0.59 [95% CI 0.48, 0.71; $p = < 0.00001$, $I^2 = 0\%$]).

Conclusion

Game-based training is proven to improve healthcare workers' triage accuracy significantly, hence reducing disaster mortality rates. Therefore, a larger scale of studies and long-term follow-up is needed to evaluate its impact on diagnostic accuracy and decision-making, aiding its integration into academic and clinical programs to minimize mortality rates in disasters.

Keyword

accuracy, game, healthcare workers, training, undertriage

Hyperbaric Oxygen Therapy As a Novel Treatment for Improving Memory Recall in Mild Traumatic Brain Injury: A Meta-Analysis

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Introduction

Mild traumatic brain injury (mTBI) is an acute brain injury condition caused by external forces, possibly arising from natural disasters. During the magnitude 8.0 earthquake in Wenchuan, 5,204 of 28,008 patients suffered from traumatic brain injury (TBI), with 63% of the TBI cases being mild. mTBI might not seem urgent and is often overlooked. However, mTBI can lead to loss of consciousness, disorientation, disability, and post concussion syndrome that leads to memory loss. Studies have shown that current treatments lack evidence towards a patient's recovery, especially those with more developed symptoms and disability, such as memory loss. Hyperbaric oxygen therapy (HBOT) serves as a novel solution towards this problem. However, there is still an ongoing debate on the efficacy of HBOT in improving memory recall. This leads to the objective of this study; to investigate the efficacy of 1.5 atmosphere absolute (ATA) HBOT in improving memory recall in mTBI patients..

Method

This study was conducted with the Preferred Reporting Item for Systematic Review and Meta-analysis (PRISMA). We conducted a search through PubMed, ScienceDirect, Scopus, and Cochrane up to 16 March 2024. The included studies were screened for risk of bias using the Cochrane Risk of Bias 2.0. Effect estimates were pooled using fixed-effects meta-analysis in Review Manager 5.4.

Result

Five studies in 2 countries with a total of 219 participants were included with low risk of bias. 1.5 ATA HBOT shows a significant memory recall increase with a standardized mean difference (SMD) of 0.36 ($p = 0.01$, 95% CI: 0.08 – 0.64).

Conclusion

1.5 ATA HBOT shows significant improvement in the memory recall function of mTBI patients. Hence, HBOT can be a novel treatment to improve memory recall in mTBI patients.

Keyword

hyperbaric oxygen, mild traumatic brain injury, natural disaster

Traffic Trauma Attendance & Influence of Socioeconomic Status Trends Before and During COVID-19 in Hong Kong: A Cross-Sectional Analysis

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Introduction

Studies have suggested that the recent COVID-19 pandemic led to a significant drop in global road traffic mortality and accident rates. To expand upon this, this study aims to investigate the effects of the COVID-19 pandemic on traffic accident attendance in Hong Kong, and further evaluate the relationship between neighbourhood socioeconomic status (SES) and traffic accident attendance before (n1; 2013-2019) and during pandemic years (n2; 2020-2023).

Method

ER admission records following a traffic accident between 2014 and 2023, derived from the Clinical Data Analysis and Reporting System (CDARS) Database were analysed. Cases were stratified according to the patients' residential district Social Deprivation Index (SDI) to assess neighbourhood SES. Comparative analyses were performed to assess traffic trauma attendance and death outcomes.

Result

Annual median attendance of traffic trauma attendances was not found to differ significantly before and during the pandemic (n1=21,514, n2=23,558, p=0.3). However, there was a noticeable reduction of traffic trauma attendances in 2020, correlating with the local epidemic of COVID-19. More males than females were involved in traffic accidents yearly, both before and during the pandemic (p<0.001). SDI was found insignificant to overall traffic trauma attendance or death outcomes. However, further analysis using Chow test suggested a marginally significant break in the relationship between SDI and traffic trauma attendance before and during the pandemic (F= 2.74, p<0.1). This illustrates a change in the population admitted for traffic accidents cases.

Conclusion

Traffic trauma attendance was found not to be influenced by the COVID-19 pandemic nor SDI, but the significant drop in attendance following the local outbreak at the beginning of COVID-19, coupled with the increased SDI amongst drivers admitted for traffic trauma during pandemic years suggests that the prolonged pandemic protocols may have led individuals with a greater socioeconomic burden to drive.

Keyword

traffic trauma, SDI, COVID-19 pandemic, public health



Public Poster

Unveiling the Covid-19 Phenomena in Malaysia: Insights From Media Reporting on Healthcare Workers and Public Efforts

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Introduction

The COVID-19 pandemic caused countless challenges to the Malaysian healthcare system. This content analysis aims to investigate the primary source of information from local media reporting responses to the pandemic from 2020 to 2023, focusing on the challenges healthcare workers face and how Malaysians implemented effective strategies to cope with it. This study intends to inform policy-makers, healthcare authorities and the general public to improve healthcare management to disasters.

The study highlights the unique aspects of Malaysia's response in resolving the outbreak. Starting from March 2020, dynamic shortages of personal protective equipment (PPE), ventilators, gloves, medication and other equipment, along with long working hours of healthcare personnel with high infectious risk occurred. Despite these difficulties, they demonstrated resilience and creativity in handling the pandemic—sewing and designing self-made PPE and developing a contact-tracing MySejahtera application. Numerous non-governmental organizations (NGOs) and manufacturers selflessly contributed to supplying urgent equipment to rescue Malaysia from the pandemic, reflecting the public's determination to secure the frontliners in return. The public adapted to new norms after the nationwide implementation of Movement Control Orders (MCOs), yet had an awareness of civic duty, facing the post-COVID impact and improving the Malaysian healthcare system via more robust policy adjustment

Keyword

COVID-19, pandemic, health personnel, public health, personal protective equipment

Surviving Earthquake PTSD: Be The CARE

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Introduction

Earthquakes have been occurring worldwide since the 2000s and until today, it still continues to cause disruption to the society physically, economically and mentally. In 2023, 1,712 earthquakes were recorded around the globe including Japan, Indonesia, Philippines, China, Canada and Turkey. The suffering and loss caused by earthquakes have led to post-traumatic stress disorders (PTSD) in countless of earthquake survivors amounting up to 17,706 patients based on a systematic review in 2016. A research study conducted in 2022 concluded that the prevalence of PTSD in earthquake survivors was 1 out of 5 in Piura, while over half of the survivors in the 2023 Turkey earthquake were diagnosed with PTSD.

Objective

This poster aims to raise public awareness on the definition of PTSD and its high occurrence among earthquake survivors. It also aims to educate the public using mnemonics "PAIN" for symptoms (Persistent, Avoidance, Increased arousal and reactivity, Negative change in mood and thinking), and "CARE" for how the public can support the survivors having PTSD (Conduct mindful activities together, Assist with practical needs, Ready to offer a safe space, Encourage professional help). Collectively, this poster aspires to unite individuals in best aiding the victims of PTSD.

Keyword

earthquake, survivor, post-traumatic stress disorder, symptoms, support

Wolbachia-Carrying Aedes Mosquitoes: A Novel Vector Control Strategy

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Introduction

Climate change drives global temperature rise and erratic precipitation patterns, leading to the spread of mosquito-borne diseases, especially in Europe and North America. Extreme weather, particularly heavy rainfall, has increased dengue fever incidences, notably in highly urbanized areas like Thailand and China. Population displacement and forced movement patterns following natural disasters contribute to the global emergence of Aedes-borne viral disease epidemics. Despite extensive knowledge on responding to dengue, healthcare systems' effectiveness depends on real-world experience. Urgently needed are new and effective preventive measures to combat outbreaks.

Among emerging control strategies, a biological approach seems promising. By genetically modifying vectors using Wolbachia, a bacteria endosymbiont, the vector's fitness and reproductive capabilities can be reduced while resistance to the dengue virus is increased. Singapore has successfully implemented this strategy, leading to a significant reduction in both the *Aedes aegypti* population and dengue fever cases. Despite cost-effectiveness due to self-sustaining capabilities, only Malaysia and Singapore have embraced this technique alongside the World Mosquito Program.

Objective

This poster aims to provide background information on the novel strategy of releasing Wolbachia-infected mosquitoes to policymakers and encourage them to assess its potential in being a primary prevention for dengue fever in new endemic areas.

Keyword

dengue, wolbachia-carrying aedes, climate change

Shake or Quake, Dialysis is OK

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Introduction

Taiwan holds the top spot globally for renal dialysis rates, yet it also resides in an earthquake zone. The looming possibility of a severe earthquake akin to the 1999 Jiji earthquake presents a critical question: What recourse do hemodialysis patients have to prolong their lives in the chaos? Disasters, especially earthquakes in Taiwan, are no longer hypothetical scenarios; they are a stark reality. Thus, it is imperative that dialysis patients, their families, healthcare providers, and rescue teams are equipped with the necessary knowledge and preparedness for such emergencies.

Objective

In this poster, we aim to offer practical advice to the dialysis patients and their families on essential protocols to follow for preparation, during earthquakes, some dietary guidelines as well as some technologies that could aid in monitoring the health status of hemodialysis patients. We would like to convey the idea that there's always hope no matter how chaotic the disaster is. By diligently adhering to the guidelines, we can navigate through it with confidence! Shake or Quake, Dialysis is OK!

Keyword

earthquake, renal failure, dialysis, evacuation kit, dietary guidelines

Are We Prepared? Understanding Dzud - The Unique Mongolian Disaster and Strategies for Early Preventive Measures, Emergency Care

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Introduction

Dzud is a Mongolian term for a severe winter disaster where heavy snow, extreme cold, or other conditions render forage unavailable, leading to high livestock mortality and presenting public health challenges. This year, Dzud hit hard. 97.5 thousand herding families in 18 provinces have suffered. 2728 households lost 70% or more, and 380 lost everything. Nationally, 5,222,950 livestock perished by 2024. Blocked routes hamper healthcare access, leaving herder communities isolated from essential services caused by Dzud. Around 500 frostbite cases require hospitalisation annually, often losing their ability to work. Livestock losses spell long-term economic woes and psychological distress, particularly for children vulnerable to malnutrition during dzuds.

Objective

In Mongolia, there is a lack of awareness among citizens about the dzud disaster and its management. Therefore, it is crucial to distribute information and basic knowledge.

Keyword

Dzud, consequences, preventive measures, emergency care

Too Hot to Handle: Prevention and Identification of Unseen Heatwaves

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Introduction

Heatwaves are defined as excessively hot weather conditions that can last several days. With the current temperature projections and climate conditions, heatwaves are likely to occur more frequently across the world, predicted to be 4400 times more likely in the US alone. They are accountable for the highest number of deaths among all natural disasters in Australia. Asian countries are not spared with their rapid development and hence worsening of the 'urban heat island' effect, predisposing them to heatwaves in hotter months. China experienced their longest heat wave of 70 days in 2022.

Public preparedness and an effective heat-health action plan are essential in prevention, response and recovery. The deadly impacts of this insidious disaster shall not be overlooked due to its inconspicuous exacerbation.

Objective

This poster aims to raise awareness regarding the identification and prevention of heat wave-related illnesses in the context of global warming and increased climate related disasters. We aim to present the early signs of heat wave-related illnesses, and implementation of public health measures to inform and engage the community. We will also include information on vulnerable populations such as elderly and those with chronic conditions and how the healthcare system should prioritise them during disasters.

Keyword

heatwaves, climate change, prevention

ERUPTION?! Recognize the SIGNS, Prevent the IMPACT with PROTECTION

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Introduction

About 500 out of 1350 volcanoes have erupted in recorded history, leading to catastrophic loss of life, property damage, and a decreased quality of life due to the health impacts following the eruption. In the 20th century alone, approximately 98,386 fatalities and 5.6 million affected people have owed their causes to volcanic activity. Moreover, about 81% of the world's most extensive eruptions have occurred along the Ring of Fire, which stretches across 15 countries including Indonesia, the Philippines, Japan, Mexico, and more. It is estimated that 800 million people worldwide live within 100 km of an active volcano. Volcanic eruptions can have multiple impacts, especially on health such as respiratory disease, trauma, burns, and mental disorders. Hence, preparation and education are crucial in reducing risks and responding effectively to volcanic eruptions. However, dissemination of information regarding preparation and education is still lacking in many regions. Thus, we designed this public poster to increase public awareness and emergency preparedness for volcanic eruptions.

Objective

This poster aims to increase public awareness about volcanic eruption risks and suggest preventive measures to avoid complications.

Keyword

volcanic eruption, prevention, health impact, public awareness

Motherhood in Crisis: Prioritizing Perinatal Well-being with BLESS

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Introduction

As expectant mothers approach their due dates, concerns of miscarriage typically intensify. This is commonly experienced by women eagerly awaiting the child's arrival. Nonetheless, in the event of an unforeseen catastrophe, pregnancy tends to be the last priority they have in mind during survival time. Approximately 50% of maternal fatalities occur in regions due to conflicts or disasters, highlighting the urgency for comprehensive disaster planning for perinatal health. Although there have been numerous studies on this matter, existing research predominantly focuses on maternal mortality in non-disaster circumstances, leaving an extensive gap regarding difficulties maternal health faces during disaster.

With BLESS, our poster aims to engage not only pregnant women but also the wider community. Through the establishment of emergency medical facilities, emotional support, and ensuring access to essential resources, this educational poster seeks to help ease childbirth concerns during disaster.

Objective

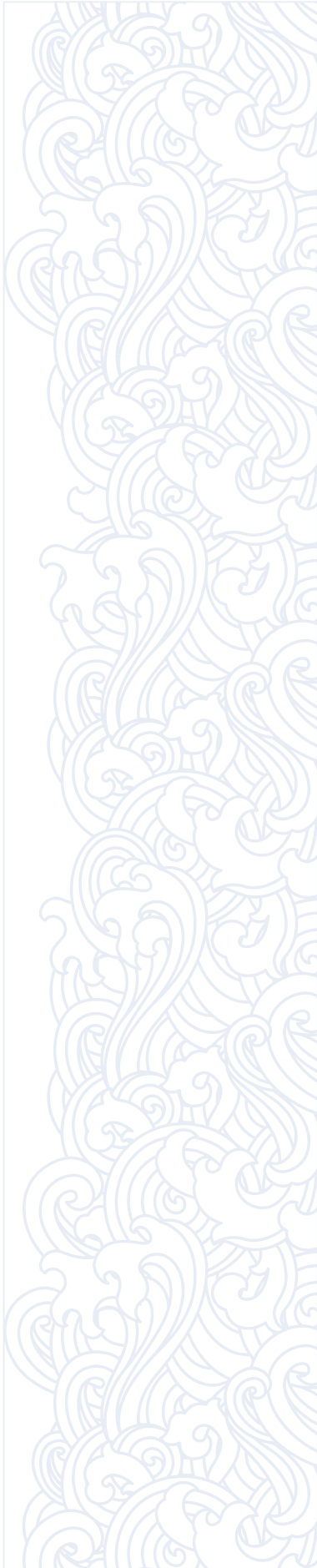
With the Global Strategy for Women's, Children's, and Adolescents' Health from Sustainable Development Goals as our guideline, this poster aims to promote public awareness of the specific challenges families face during disaster, particularly among individuals in the perinatal stage, highlighting critical strategies and practical advice to safeguard the safety and well-being of both the mother and her fetus.

Keyword

disaster, perinatal, pregnancy, preparation, well-being



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