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# A Study Protocol on Disaster Medicine Preparedness among Medical Students in a Public Military Medical School in Malaysia: Assessment of Knowledge, Attitude and Readiness to Practice

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## ABSTRACT

Disaster preparedness is defined as the measures taken to prepare for or decrease the impact of disaster. Medical students' perception on disaster preparedness provides further insights into their learning needs, strengthens the disaster medicine curriculum, and improves their personal professional development. There is scarce information regarding this topic and disaster medicine education is scattered in the current medical curriculum. The aim of this study is to assess the knowledge (K), attitude (A) and readiness to practice (rP) towards disaster preparedness among medical students in a military university. A cross-sectional study will be conducted among all the medical students in Universiti Pertahanan Nasional Malaysia using a self-administered validated questionnaire via a Google Forms. The calculated minimum sample size is 176 using the two-proportion formula via Power and Sample Size (PS) software. The questionnaire consists of (a) demographic data; (b) knowledge of disaster; (c) attitude; (d) readiness to practice with responses categorised as high, moderate and low. Independent *t*-test and chi-square test are used to evaluate the bivariate association between demographic data with K, A and rP. Multiple linear regression is used to evaluate association of rP based on predictor variables (K, A and sociodemographic factors). A preliminary result of the study will be presented in conferences and scientific meetings. This research contributes valuable insights to the field of disaster medicine education, guiding curriculum development, and informing policy decisions within institutions.

**Keywords:** *Medical students, Disaster medicine, Disaster preparedness, Knowledge, Medical curriculum*

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## INTRODUCTION

Globally, health care professionals play a crucial role in delivering medical care across all phases of disasters. A disaster is defined as a severe disruption to a community, involving widespread human, material, or environmental losses that surpasses the capacity of the society to manage using its own resources (1). Disaster preparedness, encompassing planning, organisation, and practice for future disaster responses, is a pivotal phase aimed at minimising losses and enhancing resilience (1, 2). In healthcare organisations, this phase is vital for a coordinated response to disasters, improving the functionality of the system. Therefore, preparing healthcare professionals during medical school is essential. Early exposure to disaster medicine contributes to their personal and professional development. Martin et al. (3) emphasised the importance of education, training, and competency for successful disaster preparedness.

Disasters, classified by the Emergency Events Database (EM-DAT), fall into two main categories. The first includes natural calamities like earthquakes, floods, tsunamis, droughts, wildfires, and biological hazards (i.e. pandemics). The second category involves human-made disasters such as chemical spills, transportation accidents, and environmental pollution (4). Malaysia is frequently affected by natural disasters including floods, landslides, haze, and human-made calamities (5, 6). In the past two decades, the country has experienced 51 natural disaster events (5–8). The consequences are extensive, affecting individuals, society, and the environment, resulting in outcomes such as loss of lives, psychosocial consequences, infrastructure damage, population displacement, and notable economic and political impacts (4, 8). The recent COVID-19 pandemic exposed deficiencies in disaster preparedness, leading to an upsurge in healthcare service demand and disruptions in healthcare delivery, financial constraints, and educational challenges (4, 8, 9). The escalating global occurrence of disasters and the repercussions of the COVID-19 pandemic further underscore the necessity for disaster preparedness training among medical students (1, 9, 10). These students may be called upon to provide both medical and non-medical aid during disasters. They serve as valuable assets to the healthcare team during global health emergencies, playing potential roles in all phases of disaster management, including mitigation, preparedness, response, and recovery (3). Successful disaster management relies on preparedness, constituting an organisational process that incorporates knowledge, attitudes, and practice of disasters (6, 7). Therefore, evaluating their KAP is vital to understand what is known (knowledge), believed (attitude), and done (practiced) in the context of disaster preparedness. This KAP survey serves as a valuable tool to gather baseline information, adapt targeted interventions, and measure the impact of initiatives ultimately contributing to more effective disaster medicine preparedness strategies and programmes.

Su et al. (11) demonstrated that low knowledge in disaster situations was significant among medical students in China. Similarly, students from European nations, such as Germany, the Netherlands and Italy, displayed low confidence and knowledge in disaster medicine (12–14). These findings suggested that disaster training and courses are very much needed worldwide. Studies carried out in Pakistan (15), Qatar (16), Jordan (17) reported a moderate level of knowledge, attitude, and readiness to practice in disaster medicine preparedness among healthcare students. Notably, the knowledge and attitudes of students have been established as significant predictors of their readiness to practice. Li et al. (18) also found that most of the health care students had a moderate level of K and A, and a high level of readiness to practice disaster medicine preparedness. Research carried out in Singapore revealed that medical students exhibit a moderate level of knowledge, attitude, and readiness to volunteer in disaster situations (19). The study underscored that those individuals with prior disaster training showed higher scores in both knowledge and attitude, while those with previous

volunteering experience demonstrated higher attitude and readiness scores (19). Engaging in disaster training programmes improves students' preparedness for disasters, leading to heightened proficiency in knowledge, attitude and skills related to disaster management (9). Byrne et al. (2) found that while many medical students express a willingness to volunteer during pandemics and disasters, their lack of preparedness is evident. This is attributed to an overall poor understanding of disasters, likely resulting from limited inclusion of disaster-related education in medical school curricula. Lack of disaster preparedness may affect their competence in handling disasters in their future professional roles (2, 7, 8). Studies have shown that well-trained healthcare professionals are more likely to exhibit resilience, reducing the disaster impact on communities and enhancing overall disaster response and recovery efforts (1, 9, 15, 20).

The Sendai Framework for Disaster Risk Reduction 2015–2030 recognises that promoting education and training activities in the field of disaster medicine is a fundamental component of disaster risk reduction (21). Implementing disaster preparedness training for medical students enhances readiness, knowledge and skills, boosting their confidence and response effectiveness (9, 18). This training covers coordinating disaster response, collaborating with emergency responders, teamwork, critical thinking, problem-solving, and understanding the social, political, and environmental factors contributing to disasters. Nonetheless, despite its significance, there is a lack of standardisation in disaster medicine courses for medical students (2, 3, 9). Identifying the barriers to disaster management among medical students requires a multi-faceted approach encompassing faculty development, resource allocation, curriculum design, and raising awareness about the importance of disaster medicine education among students and stakeholders (22). The challenges in establishing a disaster medicine curriculum arise from the lack of teaching, poor integration of disaster management education into medical schools, and a shortage of consistent use of reproducible and comprehensive curriculum development methods that lead to considerable heterogeneity in covered topics and course designs (2, 21, 22). Integrating a comprehensive disaster medicine course with experiential learning is essential within the medical curriculum (19, 20). Universities play a pivotal role in its implementation by serving as educational hubs for healthcare professionals, facilitating knowledge dissemination and training (12, 23, 24). Healthcare professionals are expected to have essential skills and training across all levels to contribute to preparedness, recovery, and relief efforts during disasters, aligning with the guidelines of the Joint Commission on Accreditation of Healthcare Organizations (25).

The Universiti Pertahanan Nasional Malaysia (UPNM) has a unique faculty of medicine. It is the only faculty of medicine in Malaysia that offers combined conventional medical education and military medicine training (26). Its objective is to produce competent doctors who will be able to adapt to both conventional and disaster related environments. This research will greatly improve the disaster medicine curriculum, helping medical students develop resilience in managing disasters and contributing to their personal and professional growth. Notably, there is no published data in Malaysia examining medical students' knowledge, attitude, and readiness to practice in disaster preparedness, particularly in a military medical school.

## Objectives

The main objective of this study is to assess the level of disaster medicine preparedness of medical students by examining their knowledge, attitude, and readiness to practice, employing a validated survey questionnaire. The findings of this study will provide valuable

insights on the existing comprehension, attitude, and readiness to practice of the prospective healthcare practitioners in responding to emergencies and disasters. This information is invaluable for curriculum development, allowing educators to customise programmes that address specific areas where students may require additional training and education.

## METHODOLOGY

This study will use a cross-sectional design and will be conducted at UPM, the only medical school in Malaysia that uniquely combines conventional medical education with military medicine training. The research will be conducted over a period of six months and involves a total of 257 medical students at UPM. To ensure a comprehensive approach, all medical students, from the first year to the final year, will be invited to participate through a universal sampling method.

Data collection will be carried out through a validated self-administered questionnaire, for which permission to adapt will be obtained from the original author. The questionnaire is structured into four parts. The first part focuses on sociodemographic data, while the second and third parts assess knowledge (K) and attitude (A) towards disasters, respectively. The fourth part measures the readiness to practice (rP) among medical students. In the knowledge section, there will be 21 questions, answered with dichotomous responses of “Yes” or “No”. The scores range from 0 to 21 points. The attitude section contains 16 questions with each question recording a 5-point Likert score (strongly agree = 5, agree = 4, neither agree nor disagree = 3, disagree = 2, strongly disagree = 1). The total points for the attitude section ranges from 16 to 60 points. The readiness to practice section, with 9 items, follows a similar pattern. Items 8a and 8b have reversed scores, and the scores range from 9 to 45 points. The Cronbach’s alpha values for K, A, rP, and total KARP were 0.973, 0.840, 0.705, and 0.888, respectively (15). The original author used quartile cutoff points for each of the K, A, and rP domain, while this study adopts two categories based on the midpoint: higher and lower. The research instrument will be in the form of Google Forms, distributed online to participants. Clear instructions and information about the study will accompany the online consents obtained. A pilot test will be conducted to ensure the feasibility of the study.

## Data Analysis

Data will be entered in the SPSS programme. Missing data will be recorded and the decision will be made by the research team for data imputation, if possible. A descriptive analysis will be conducted for categorical and continuous data. The Kolmogorov Smirnov statistic will be evaluated for continuous data, a non-significant result indicate that the data is distributed normally. The results will be tabulated as frequency (%) for categorical data, and either mean ( $\pm$ SD) or median (IQR) for continuous data. The independent *t*-test and one-way ANOVA will be used to calculate the mean differences for each group. Finally, the readiness to practice as the dependent variable will be tested with simple linear regression and multivariable linear regression.

## DISCUSSION

The study results offer essential inputs for designing an effective undergraduate disaster medicine curriculum and serve as baseline data for future evaluations to measure the success of the programme. A well-designed curriculum can standardise the teaching of disaster medicine

across the nation. This study marks the initial step in creating awareness and improving effective disaster management, with plans for further research in disaster medicine. The research findings will be disseminated through various channels, including publication in academic journals, presentations at conferences and scientific meetings, and sharing of key findings with relevant stakeholders such as lecturers in the medical faculty, the medical education unit, and the academic office of the university.

## CONCLUSION

Examining the knowledge, attitude, and readiness to practice disaster medicine preparedness among medical students is essential. The continuous and evolving nature of disasters highlight the significance of understanding disaster management. Hence, it is essential to establish a solid foundation for future healthcare providers in the fundamental principles of disaster medicine. The results of the study will play a crucial role in shaping a robust educational framework, supported by scientific evidence, within the realm of disaster medicine.

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## ETHICAL APPROVAL

The Research Review Committee at the Faculty of Medicine and Defence Health, UPM, has reviewed this study protocol (SF0119-UPNM/2022/SF/SKK/1). Ethical approval for conducting this study has been granted by the Research Ethics Committee, UPM, under the reference number JKEP: 4/2023.

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