

Knowledge, Attitude, and Practice towards Disaster Preparedness among Medical Personnel in Emergency Departments in Malaysia

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ABSTRACT

INTRODUCTION: Disasters are incidents that can cause damage to properties and loss of lives. Disaster preparedness is a set of measures undertaken in planning for disaster situations. The objectives of this study were to determine the level of knowledge, attitude, and practice (KAP) towards disaster preparedness and its associated factors among emergency department (ED) medical personnel. **MATERIALS AND METHODS:** This study was conducted in 12 hospitals in Malaysia. A validated questionnaire was used and 427 participants were involved. This study was carried out from March 2019 to March 2020. **RESULTS:** This study showed that ED medical personnel in Malaysia had adequate KAP towards disaster preparedness, which scored 91.6%, 78.2%, and 61.1%, respectively. An increased level of knowledge was related to experience and training in disaster response, whereby the increased level of practice was associated with duration of working experience. However, there was no association between the level of attitude and disaster preparedness. **CONCLUSION:** Continuous education and training on disaster preparedness for ED medical personnel are necessary to prepare staff in the event of disaster and to improve the healthcare system.

Keywords

Disaster, Knowledge, Attitude, Practice, Questionnaire

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Received: 17th August 2024; Accepted: 6th Mac 2025

Doi: <https://doi.org/10.31436/imjm.v24i03/2428>

INTRODUCTION

Disasters are defined as sudden accidents or natural catastrophes that cause great damage to properties or loss of lives, exceeding the affected community's capacity to cope using their available resources. Natural disasters such as landslides, tsunamis, floods, and typhoons occur almost every year around the world. Based on the statistics from the Red Cross Society, Asia is the most disaster-prone area of the world and this is due to its geographic location.¹

Disaster preparedness in a country is a set of measures undertaken in planning for disaster situations. The four phases of disaster preparedness are mitigation, preparedness, response, and recovery. Mitigation is a phase before or after the disaster has occurred and it involves planning to either prevent such future disasters or minimise their impact on the community. The preparedness phase is the most important, as it involves preparing to handle a disaster before it occurs.

Preparation includes stockpiling of food and water, creating evacuation plans, and organizing response and rescue operations. The next is the response phase that takes place when the disaster is occurring, and execution of the preparedness plan. Finally, the recovery phase is focused on the actions taken after the disaster so as to return to its normal conditions.²

In Malaysia, the role of Emergency Medical and Trauma Services (EMTS) is crucial in disaster and major incident management, as outlined by the Malaysian National Security Council (MKN) and the National Disaster Management Agency (NADMA). The EMTS works in close collaboration with MKN and NADMA to ensure a coordinated response during disasters. The EMTS is responsible for providing immediate medical care at the disaster sites by conducting triage to prioritise victims and providing initial stabilisation of the injured persons. Additionally, the EMTS is responsible for ensuring rapid

and safe transport of patients to the appropriate medical facilities. Besides the response phase, EMTS also participates in all other phases of disaster preparedness, which are mitigation, preparedness, and recovery.³ Although the EMTS may not be the leading agency for all types of disasters, it plays a crucial role in responding to medical emergencies and providing trauma care during various types of disasters, including natural disasters, man-made disasters, mass casualty incidents, and public health emergencies such as disease outbreaks or pandemics. Other rescue agencies besides the EMTS are the Fire and Rescue Department of Malaysia (JBPM), the Royal Malaysian Police (PDRM), the Malaysian Civil Defence Force (APM), and the Malaysian Armed Forces (ATM).

Climate change and deforestation in Malaysia are causing increasing in the number of disasters such as floods and landslides. This study was conducted to examine the disaster preparedness among medical personnel in Emergency Departments (EDs) in various hospitals in Malaysia. Previous studies done in other countries have shown gaps in the knowledge, skills, and abilities of emergency medical personnel regarding emergency preparedness and disaster response.⁴ Currently, there are few studies conducted in Malaysia on the disaster preparedness among ED medical personnel. One study covered emergency nursing and medical personnel's knowledge, attitude, and practice (KAP) in hospitals in the East Coast region of Malaysia and the outcome showed that the level of KAP was below average, although the level of attitude was acceptable.⁵ The current study explored all regions in Peninsular Malaysia and it involved more medical personnel. Since emergency medical (ED) personnel play a major role as front-line workers, it is important that all emergency hospital staff are updated and equipped in knowledge, and well-prepared to minimise the impacts of disasters. The findings of this study will benefit the EDs in identifying specific strategies to improve KAP among hospital staff.

MATERIALS AND METHODS

This is a cross-sectional study, which targeted all ED

medical personnel in 12 hospitals in Kedah, Penang, Kelantan, Pahang, Johor and Klang Valley. This study was carried out from March 2019 to March 2020. The inclusion criteria encompassed all ED medical personnel including doctors, assistant medical officers, and nurses working in the ED during the study duration. Those on leave during the study period were excluded. A total of 430 personnel was randomly selected.

A validated questionnaire was utilised to collect the study data. This questionnaire comprised three domains: knowledge, attitude, and practice. A score of more than 60% in each domain was considered to indicate adequate KAP. The 60% cut-off point was chosen based on a previous study.⁶ The questionnaire was distributed to all personnel, and of the 430, 427 responded (99.0%).

Socio-demographic characteristics were summarised by using descriptive statistics. The level of KAP among emergency department medical personnel was also summarised using descriptive statistics. The associated factors and the level of KAP was analysed using multiple logistic regression.

RESULTS

The sociodemographic data obtained were expressed as n (frequency, %) for categorical variables tabulated as in Table 1. The 3 respondents excluded due to incomplete questionnaire responses. Of this, the majority of 427 respondents were aged 40 years or younger (91.1%, n=389). In relation to gender distribution, 55.0% (n=235) were males and 45.0% (n=192) were females. There was a variation in the education levels of the respondents. Most of the degree holders (166, n=38.9%) were doctors whereas diploma holders (231, n=54.1%) were assistant medical officers and nurses. Slightly more than half of the participants (55%, n=235) have had experience in a disaster incident, although specifics regarding the type and timing of these disasters were not provided. With regards to disaster training, most of them had undergone disaster response training (n=332, 77.8%). More than half had attended disaster drill exercise (n=187, 56%), 23% had participated in field stimulation, 9% had attended tabletop exercise, and the remaining

had attended didactic or functional exercise. Among this, some participants had received training or education continuously throughout their employment.

Table 1: Descriptive statistics among participants (n=427)

Variables	N (%)
Age	
<30	203 (47.5)
30-40	186 (8.9)
>40	38 (43.6)
Gender	
Male	235 (55.0)
Female	192 (45.0)
Education level	
Certificate	13 (3.0)
Diploma	231 (54.1)
Degree	166 (38.9)
Master	17 (4.0)
ED experience	
<1 year	83 (19.4)
1-4 years	166 (38.9)
5-10 years	111 (26.0)
>10 years	67 (15.7)
Experience disaster response	
No	192 (45.0)
Yes	235 (55.0)
Training for disaster response	
No	95 (22.2)
Yes	332 (77.8)

Abbreviation: ED, Emergency Department

Regarding the level of KAP among ED medical personnel, we found that most participants demonstrated adequate knowledge (n=391, 91.6%) and positive attitude (n=334, 78.2%), while more than half exhibited adequate practice (n=261, 61.1%). Over 80% of respondents answered correctly regarding disaster definition and disaster management in the knowledge domain. The majority of the respondents also recognised that disasters increased the risk of developing communicable diseases among the affected communities and agreed that population displacements can cause social burdens to inhabitants.

In terms of attitude, more than 80% of respondents agreed that it is important for them to understand disaster management. Most of them expressed willingness to be involved during disaster response efforts. Additionally, more than 80% believed that collaboration among medical and health personnel is needed in managing disaster victims. However, half of the respondents felt that assisting disaster victims with their basic needs is not their responsibility. Furthermore, 80% of the respondents agreed that medical or health personnel should be educated about the long-term impact of disasters, such as mental health problems.

More than half knew the location of their disaster response plan and agreed that it could be easily accessed and 70% had read their institution's disaster response plan and almost half of them had read the plan apart from their institution. More than 90% were willing to be involved in disaster training and more than 75% were prepared to be involved in any disaster response. More than half were familiar with the field triage system that is used during disasters. Most of them stated that their institutions had disaster education or training conducted regularly and if conducted, most of them agreed it involved other agencies as well such as fire rescue teams.

A simple logistic regression test was conducted to determine the association between KAP and the variables. These results are summarised in Tables 2, 3 and 4. Experience in disaster response and training for disaster response were found to be the only associated factors towards adequate knowledge among participants, with 2.04 times the odds of having adequate knowledge compared to participants without experience in disaster response (95% CI: 1.02, 4.11) and 3.16 times the odds of having adequate knowledge compared to participants without training for disaster response (95% CI: 1.57, 6.38) (Table 2). This current study also revealed that there was no significant association between all related variables studied towards attitude (Table 3).

Table 2: Association between socio-demographic characteristics and knowledge

Variables	Regression coefficient, b	Crude Odd Ratio (95% CI)	Wald statistics (df)	p value
Age				
<30	0	1		
31-40	0.66	1.93 (0.91,4.11)	2.95	0.086
>40	0.35	1.42 (0.40,4.996)	0.30	0.587
Gender				
Male	0	1		
Female	0.02	1.02 (0.52,2.03)	0.004	0.948
Education level				
Certificate	0	1		
Diploma	-0.58	0.56 (0.07,4.45)	0.30	0.582
Degree	0.99	2.68 (0.29,24.85)	0.76	0.385
Master	18.72	134622903.57 (0.00,0.00)	0.00	>0.95
ED experience				
<1 year	0	1		
1-4 years	0.00	1.00 (0.41,2.44)	0.00	>0.95
5-10 years	0.46	1.59 (0.55,4.56)	0.73	0.393
>10 years	0.28	1.32 (0.41,4.25)	0.22	0.639
Experience disaster response				
No	0	1		
Yes	0.71	2.04 (1.02,4.1)	4.01	0.042
Training for disaster response				
No	0	1		
Yes	1.15	3.16 (1.57,6.3)	10.31	0.001

Table 3: Association between socio-demographic characteristics and attitudes (427)

Variables	Regression coefficient, b	Crude Odd Ratio (95% CI)	Wald statistics	p value
Age				
<30	0	1		
31-40	0.26	1.29 (0.79,2.10)	1.05	0.305
>40	-0.002	0.998 (0.44,2.25)	0.00	>0.950
Gender				
Male	0	1		
Female	0.27	1.31 (0.82,2.09)	1.29	0.257
Education level				
Certificate				
Diploma	0	1		
Degree	0.69	2.00 (0.63,6.37)	1.38	0.241
Master	1.13	3.08 (0.94,10.11)	3.44	0.064
ED experience	0.41	1.50 (0.33,6.92)	0.27	0.603
<1 year	0	1		
1-4 years	0.37	1.45 (0.78,2.70)	1.40	0.236
5-10 years	0.38	1.50 (0.74,2.87)	1.20	0.273
>10 years	0.14	1.15 (0.55,2.42)	0.14	0.713
Experience disaster response				
No	0	1		
Yes	0.07	1.07 (0.67,1.69)	0.08	0.780
Training for disaster Response				
No	0	1		
Yes	0.02	1.03 (0.59,1.78)	0.01	0.931

Abbreviation: ED, Emergency Department

In Table 4, there was a significant association between age, gender, years of ED experience, experience in disaster response, and training in disaster response towards practice. Participants aged 31 to 40 years old had 1.6 times the odds and those aged age over 40 years old had 5.82 times the odds of exhibiting adequate practice compared to participants aged under 30 years old (OR=1.60, 96% CI:1.06, 2.40, $p=0.024$ and OR=5.82, 96% CI: 2.18, 15.47, $p<0.001$). Female participants showed 50% lower odds of exhibiting adequate practice compared to male participants (OR=0.50, 96% CI: 0.34, 0.74, $p=0.001$). Additionally, participants with more than 10 years of ED experience, experience in disaster response, and training in disaster response were associated with adequate practice, with odds of 7.63 times, 3.76 times, and 11.68 times, respectively, compared to participants with less than 1 year of ED experience (OR=7.63, 96% CI:3.35, 17.40, $p<0.001$), no experience in disaster response (OR=3.76, 96% CI: 2.49, 5.65, $p<0.001$), and no training experience in disaster response (OR=11.68, 96% CI: 6.62,20.61, $p<0.001$).

Table 4: Association between socio-demographic characteristics and practice (427)

Variables	Regression coefficient, b	Crude Odd Ratio (95% CI)	Wald statistics (df)	p value
Age				
<30	0	1		
31-40	0.47	1.60 (1.06,2.40)	5.10	0.024
>40	1.76	5.82 (2.18,15.47)	12.37	<0.001
Gender				
Male	0	1	11.86	0.001
Female	-0.69	0.50 (0.34,0.74)		
Education level				
Certificate	0	1		
Diploma	0.62	1.86 (0.60,5.72)	0.57	0.282
Degree	-0.15	0.86 (0.28,2.66)	0.58	0.857
Master	1.03	2.79 (0.58,13.31)	0.80	0.199
ED experience				
<1 year	0	1		
1-4 years	0.44	1.55 (0.91,2.63)	2.60	0.107
5-10 years	0.74	2.10 (1.18,3.76)	30	0.012
>10 years	2.03	7.63 (3.35,17.40)	23.35	<0.001
Experience disaster Response				
No	0	1		
Yes	1.32	3.76 (2.49,5.65)	40.02	<0.001
Training for disaster response				
No	0	1		
Yes	2.46	11.68 (6.62,20.61)	72.01	<0.001

Abbreviation: ED, Emergency Department

DISCUSSION

The medical personnel in Emergency Departments (ED) are frontline workers with important roles and responsibilities if any disaster occur. Therefore, this team needs to be highly skilled and capable of managing emergency situations, especially in a disaster situation and saving lives.⁷

This study showed that the majority of ED personnel in the 12 hospitals in Peninsular Malaysia possess adequate knowledge. A similar Malaysian study conducted in the East Coast region also reported similar findings.⁵ On an international scale, a study conducted in China showed that nurses had an average level of KAP,⁸ while a study in Nigeria found that the majority had good and fair knowledge about disaster preparedness.⁴ In contrast, a study in Australia concluded that respondents had a knowledge score of less than 50%.⁹ Conversely, a study in Saudi revealed that their physicians and nurses had a satisfactory level of knowledge in disaster preparedness.¹⁰

In terms of knowledge, our study found an exceptionally high score (91.6%) compared to similar studies performed elsewhere. This might be attributed to the inclusion of medical officers, assistant medical officers, and nurses in our study, whereas other studies mainly focused on nurses and healthcare workers. More than half of the respondents were assistant medical officers who probably have more exposure to prehospital care including disasters. However, from our study, they were no association between knowledge and level of education. Another reason was the high-risk environment in the East Malaysia, which faces the South China Sea and thus frequent threats of floods, landslides, and drought every year.¹¹ From this study we found that more than half of the respondents (67%) were from central and east coast states, which are more prone to disaster occurrences. This regional exposure probably contributed to the higher level of knowledge observed in our study participants.

Our study revealed that most of the respondents had positive attitude towards disaster preparedness and it corresponds with a previous Malaysian study⁵ and another study in Yemen.¹² However a study in Egypt revealed that only 37.5% of the respondents had a positive attitude towards disaster preparedness.¹³ The possible reason for this result in the Egyptian study was because Egypt is not typically considered a disaster-prone country, so this leads to less exposure to disasters.

Most studies have shown that health personnel often have inadequate practice towards disaster preparedness. A previous Malaysian study showed that less than half of respondents had adequate practice towards disaster preparedness,⁶ which was similar to a study in South Africa.¹⁴ The majority of participants in Saudi Arabia agreed on the need for frequent disaster simulations in their hospitals as these simulations will increase knowledge and improve practice in disaster preparedness.¹⁰ Compared to other studies, we found that training and education were very important factors in determining the level of practice. Additionally, the willingness to be involved in disaster response and training also played an important role in this regard.

Education and training play important roles in disaster preparedness and disaster management. Surprisingly, the duration of ED experience does not correlate with knowledge and attitude as expected. One would expect that the longer one works in the ED, the more knowledge they would have about disaster management. However, this study found that participants who had experienced disaster response and undergone training in disaster response exhibited adequate knowledge of disaster preparedness, similar to a study conducted in China.¹⁵ Contrarily, another study showed that Australian hospital staff were under-prepared to respond to disasters because of a lack of education, insufficient simulation exercises, and limited disaster experience.¹⁶

Based on our study, no association was found between the attitude of medical personnel and variables. A study conducted among nurses working in emergency areas and community health nurses in Saudi Arabia showed a higher positive attitude towards disaster preparedness among nurses attending disaster-related education.¹⁷ This finding was similarly observed among nurses in emergency departments in Malaysia, with the positive attitude attributed to their involvement in both disaster response and disaster-related education.⁶ However, the findings of our study contradicted these previous studies. In our opinion, this discrepancy may be due to our study mainly involving specialist hospitals, with only one non-specialist hospital included, which could probably be the main reason for no association with attending disaster-related education. More studies are needed to explore this issue.

Another important domain in this study is practice. In our study, practice refers to the use of ideas and beliefs rather than performance towards disaster management. Our study revealed significant associations between years of experience in ED, experience in disaster response, and training in disaster response towards practice. A study conducted in the United States of America demonstrated a lack of adequate training in disaster and terrorism response for emergency medical service (EMS) providers.¹⁸ According to the study, continuous medical education (CME) and simulation exercises improved their skills and

care during disaster management.^{18,19} Another study in Japan concluded that years of ED experience correlate with disaster preparedness level, as well as disaster education and training.²⁰

Training is one of the most important factors associated with practice. With correct practice, the medical personnel can develop the right attitudes and improve our knowledge regarding disaster management. To achieve this, they need to establish a proper training setup such as regular CME to educate the staff and regular exercise to improve knowledge and preparedness levels in case of disaster. To assist in meeting these training needs, a comprehensively written emergency preparedness curriculum may be used. Moreover, additional studies on a larger sample size should be conducted to provide data related to the necessity for such training among all ED staff, including paramedics.

CONCLUSION

The level of knowledge, attitude, and practice (KAP) was satisfactory among emergency department medical personnel in the 12 hospitals in Malaysia regarding disaster preparedness. Experience in disaster response and training in disaster response emerged as significant predictors of knowledge and practice in this area. Therefore, workshops focusing on theories and practices of disaster preparedness should be carried out periodically to prepare all ED staff for potential disasters. Preparedness is one of the stages of disaster management that can be addressed at our level. Thus, improving our KAP regarding disaster management is very important not only for our own preparedness in case of disasters but also to reduce the overall impact of disasters on the healthcare system. Policy makers and the hospital management must realise that continuous education and training of staff is important to prevent disastrous losses due to disasters.

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