

The Knowledge, Attitudes, and Practices of Emergency Department Staff to Preparedness of Disaster and Emergency in Saudi Arabia: Multicenter Cross-sectional Study

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ABSTRACT

Aim: Disasters worldwide are increasing, impacting millions annually. In Saudi Arabia, disaster planning is crucial for emergency department (ED) staff, who must be trained in disaster management plans and operational strategies to handle disasters such as epidemics and Hajj overcrowding.

Methodology: A cross-sectional study targeting ED staff in 92 hospitals all over Saudi Arabia. Using a self-administered survey, we surveyed ED staff, including providers (physicians and nurses). The purpose of the study is to determine the knowledge, attitudes, and practices of ED staff regarding disaster preparedness in Saudi Arabia.

Results: A survey comprised 410 participants, 57% of whom were Saudi nationals. A significant correlation was shown between years in practice and some of the answers: 54% had less than 5 (53%) or 3 (43%) years of experience for every answer of ED staff.

Conclusion: The study indicates that healthcare providers possess adequate knowledge concerning disaster preparedness. However, their attitudes, practices, and familiarity with the subject vary.

Highlights: This study evaluates Saudi Arabian ED personnel's preparedness for disasters. The results show there is variation in knowledge, attitudes, and practices, which emphasizes the necessity of continuous education to improve preparedness for disasters. Future plans have to concentrate on boosting everyone's level of preparedness in the emergency services.

Keywords: Disaster management training, Disaster preparedness, Disaster response, Emergency department, Healthcare providers.

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INTRODUCTION

Over the past few decades, many different sorts of disasters have grown increasingly dangerous on a global scale. The United Nations Office for Disaster Risk Reduction (UNDRR) defines a disaster as any significant disruption to the normal operations of a community or civilization, regardless of its size. It results from the convergence of hazardous events with exposure, vulnerability, and capability. This convergence has a variety of implications, including human, material, economic, and environmental losses and impacts.¹ Between 2008 and 2017, natural disasters affected an average of 200 million people per year, resulting in over 70,000 deaths. Exposure to severe psychological stress, such as major disasters, earthquakes, wars, and other life-threatening events, is well known to cause psychological and mental problems in the affected victims.² Inhalational injuries, though rare, are most often encountered during disasters.³ Natural disasters, technical failures, or civil upheaval all present unique issues that result in a rapid and unplanned spike in healthcare demand.⁴ Saudi Arabia has encountered severe disasters such as floods, diseases, and earthquakes, as well as man-made crises such as overpopulation at the annual Hajj pilgrimage and terrorist attacks.⁵ Considering the potential harm catastrophic disasters can impose on the economy, infrastructure, vital services, and human casualties, focusing on risk reduction, prevention, and mitigation techniques is crucial.^{6,7} Emergency department (ED) staff are vital to the

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management and resolution of disaster-related issues since they are the first to respond to medical emergencies.⁸⁻¹⁰ When ED staff members have the necessary training and abilities for disaster management and have a solid understanding of the emergency operations plan (EOP), they can play a critical role in a coordinated response.^{9,11} Emergency department personnel must be knowledgeable about emergency disasters, including their origins, symptoms, indicators, and response procedures, to be prepared. Also, adequate knowledge enables timely and accurate assessment of disaster severity and informed decision-making for patient triage, resource allocation, and treatment priorities. Considering nursing staff are one of the largest groups of healthcare teams and play multiple roles in patient care, the improvement of nurses' knowledge and skills can help them respond more effectively in emergencies.^{5,12} A positive attitude fosters adaptability and flexibility in the face of the unpredictable nature of emergency disasters. The purpose of this study is to evaluate disaster-related knowledge, attitudes, and practices among Saudi ED personnel. The major goal is to assess their comprehension and preparedness for different types of disasters. Furthermore, the study attempts to assess ED personnel's confidence in their ability to handle various types of crises effectively. The study investigates these characteristics to uncover areas of improvement and propose ideas for improving disaster preparation and response in the emergency department environment.

METHODOLOGY

Study Design

Between May 2024 and July 2024, an online survey was conducted in Saudi Arabia to collect data from ED staff at several hospitals in different regions (Central, Southern, Eastern, Western, North). The data was gathered using a self-administered questionnaire, and prior to responding to it, participants had to provide informed consent. Microsoft Forms was used to distribute the questionnaire. With Microsoft Excel, the gathered data was entered, and the Statistical Package for the Social Sciences (SPSS) program was used for analysis. Frequencies and percentages were used to express categorical data like gender, whereas mean \pm SD was used to represent continuous variables like age.

Sample Size

In order to determine the minimum number of responses required to be a representative sample for the entire population, sample size calculations were made. The Raosoft sample size calculator was used to calculate the sample size. The sample size determined was 384, with an indicator percentage of 0.50, a margin of error of 5%, and a confidence interval (CI) of 95%.

Study Population and Technique

The sample was collected from the ED staff (92) from hospitals across different regions in Saudi Arabia. The study used a non-probability convenience sampling method that was conducted among emergency physicians and nurses from medical centers in Saudi Arabia. The collected data was transferred to the Statistical Package for the Social Science (SPSS) program for statistical analysis. Qualitative and quantitative variables were represented using numbers and means, respectively. Chi-square and *t*-test were used to describe the possible correlations between different variables; the *p*-value will be considered significant at ≤ 0.05 .

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Inclusion Criteria

Only individuals who were employed by the ED and gave their agreement were included in the study.

Exclusion Criteria

247 participants who worked in departments other than emergency were excluded from the study, as were those who refused to answer the questionnaire.

Data Collection Tool

The data was collected via randomly distributed electronic online English questionnaires. After taking informed consent from the subjects, they were involved in the study. The questionnaire was developed based on an extensive review of the related literature and the survey was used with permission.¹³ The online questionnaire included the assessment of emergency physicians' and nurses' knowledge, attitudes, practices, and familiarity with disaster and emergency preparation at some hospitals in Saudi Arabia including demographic information (age, gender, job, and work experience—years of service with ED), knowledge (5 questions), attitude (11 questions), and practice (3 questions), familiarity with emergency preparedness terms and activities (6 questions), incident command system (ICS) and your role within it (8 questions), Ethical Issues in Triage (3 questions), responses to Epidemiology and Surveillance (4 questions), responses to Decontamination (3 questions), responses to Communication/Connectivity (7 questions), responses to Psychological Issues (4 questions), responses to Special Populations (2 questions), responses to Accessing Critical Resources (3 questions), response to Overall Familiarity (1 question), and Learning/Training Preferences (3 questions). The informed consent form was placed on the initial page of the questionnaire. We used Google Forms to conduct an electronic survey, which we then distributed through different social media channels such as WhatsApp, Twitter, and Telegram. We made use of the "required to proceed" feature in Google Forms to confirm that the participants met the study requirements. Any responses that lacked informed consent or were incomplete were not included in the study.

Ethical Consideration

The provided information was kept confidential and utilized exclusively for scientific purposes, in accordance with the ethical guidelines for research involving human subjects. Approval for this study was granted by the ethics committee of King Faisal University and is referenced as KFU-REC-2024-MAY-ETHICS2315. Consent was sought on the initial page, and involvement in the study was entirely voluntary. No personally identifiable information was utilized in the data analysis or publication processes. The study received ethical approval prior to data collection.

RESULTS

Table 1 shows the sociodemographic factors among the participants. The questionnaire was distributed to medical staff

Table 1: Sociodemographic characteristics among the studied sample in relation to total knowledge score (n = 410)

Character	n (%)	Mean ± SD	p-value
Age			
<35	280 (68.29)	2.75 ± 1.83	0.005**
≤35	130 (31.71)	3.29 ± 1.81	
Gender			
Male	185 (45.12)	2.70 ± 1.92	0.03*
Female	225 (54.88)	3.09 ± 1.75	
Nationality			
Saudi	230 (56.10)	2.47 ± 1.87	<0.0001**
Non-Saudi	180 (43.90)	3.48 ± 1.64	
Region			
Central	118 (28.78)	3.25 ± 1.90	<0.0001**
Eastern	46 (11.22)	2.5 ± 1.62	
Northern	108 (26.34)	3.32 ± 1.74	
Southern	49 (11.95)	2 ± 2.02	
Western	89 (21.71)	2.71 ± 1.67	
Years of clinical experience			
≤5	224 (54.63)	2.29 ± 1.78	<0.0001**
>5	186 (45.37)	3.67 ± 1.62	
Years of service in emergency department			
≤3	218 (53.17)	2.36 ± 1.75	<0.0001**
>3	192 (46.83)	3.55 ± 1.74	
Profession			
Nurse	253 (61.71)	3.34 ± 1.64	<0.0001**
Physician	157 (38.29)	2.24 ± 1.95	

*p < 0.05 indicates statistically significant differences

Table 2: Participants' attitudes towards disaster and emergency preparedness

Attitude statements	n (%)		
	Agree	Disagree	Unsure
I do not need to know about emergency (disaster) operational plans	89 (21.81)	297 (72.79)	22 (5.39)
Management should be adequately prepared when a disaster occurs	358 (87.75)	36 (8.82)	14 (3.43)
Disaster management and planning is for a few people in the hospital	158 (38.73)	227 (55.64)	23 (5.64)
Potential hazards likely to cause disaster should be identified and dealt with	362 (88.94)	30 (7.37)	15 (3.69)
Training is necessary for all healthcare workers	370 (90.91)	25 (6.14)	12 (2.95)
Do you think it is necessary to have an emergency (disaster) operational plan?	358 (87.96)	27 (6.63)	22 (5.41)
Emergency (disaster) operational plan need to be regularly updated	361 (88.48)	27 (6.62)	20 (4.90)
Disasters are unlikely to happen in our hospital	176 (43.35)	191 (47.04)	39 (9.61)
Disaster management is for nurses and doctors only	90 (22.17)	287 (70.69)	29 (7.14)
Disaster simulations should occur frequently in the hospital	308 (75.49)	64 (15.69)	36 (8.82)
Drills should be conducted in the hospital	349 (85.54)	32 (7.84)	27 (6.62)

either in the ED or other departments from hospitals (92) in Saudi Arabia. The study only included participants working in ED and 247 were excluded. Around 68% of them were aged below 35 years old. More than half were females. More than 28% live in the center of the kingdom. Almost 57% are Saudis, 54% of the participants had worked in a clinical setting for 5 years or less, and 53% had 3 years or less of years of service in ED. In addition, more than 61% of the participants were nurses. Regarding knowledge of disaster and emergency preparedness, all of the correct responses were considered as a total score. Table 1 relates the total knowledge score to the demographic factors. It was found there are associations

between knowledge and all of the demographic factors. It was found ≥35 years old, females, northern region, >5 years of clinical experience, >3 years of service in emergency and nurses had statically significant differences in comparison to other categories (all p-values less than 0.05) with means (3.29 ± 1.81, 3.09 ± 1.75, 3.32 ± 1.74, 3.67 ± 1.62, 3.55 ± 1.74, and 3.34 ± 1.64).

Table 2 demonstrates the attitude of participants toward disaster and emergency preparedness. The majority agreed on the statements: Management should be adequately prepared when a disaster occurs 87%; Potential hazards likely to cause disaster should be identified and dealt with 88.94; Training is necessary for all

Table 3: Participants' practices towards disaster and emergency preparedness

Practice statements	n (%)		
	Yes	No	Don't know
Are disaster drills done at your hospital?	199 (48.54)	100 (24.39)	111 (27.07)
Is there ongoing training?	136 (33.17)	130 (31.71)	144 (35.12)
Is the emergency operational (disaster) plan periodically updated?	90 (21.95)	89 (21.71)	231 (56.34)

Table 4: Mean familiarity scores by the dimension of emergency preparedness information questionnaire

Dimensions	Mean \pm SD
Emergency preparedness terms and activities	12.30 \pm 5.95
Incident command system	19.89 \pm 9.26
Ethical issues in triage	6.29 \pm 3.24
Epidemiology and surveillance	9.05 \pm 4.17
Decontamination	6.61 \pm 3.25
Communication/Connectivity	16.64 \pm 8.34
Psychological issues	9.11 \pm 4.25
Special populations	4.50 \pm 2.34
Accessing critical resources and reporting	7.11 \pm 3.35
Overall familiarity	2.43 \pm 1.12

healthcare workers 90.91; necessary to have an Emergency (Disaster) Operational Plan 87%; Emergency (Disaster) Operational Plan need to be regularly updated 88%; Disaster simulations should occur frequently in the hospital 75%; and drills should be conducted in the hospital 85%). However, disagreed on statements like uninteresting to know emergency operational plans 72%, Management and planning of disaster is for a few staff members in the hospital 55%, Disasters are unlikely to happen in our hospital 47%, and Disaster management is for nurses and doctors only 70%.

Table 3 shows the practice patterns towards disaster and emergency preparedness among the studied population. About 49% of respondents reported that their hospital had conducted a disaster drill, 33% answered about ongoing training, and more than half set for the Emergency Operational (Disaster) Plan (EOP) periodical updating.

Table 4 represents the mean familiarity scores based on the dimensions of the Emergency Preparedness Information Questionnaire (EPIQ). The overall familiarity mean score among the studied sample was 2.43 \pm 1.12. The highest three mean familiarity scores for EPIQ were (Incident command system 19.89 \pm 9.26), (communication/connectivity 16.64 \pm 8.34), and (emergency preparedness terms and activities 12.30 \pm 5.95). The dimension with lowest score was (special populations with 4.50 \pm 2.34).

DISCUSSION

Healthcare providers play a critical role in the response to and management of emergencies in healthcare facilities. The frontline healthcare providers including the nurses and ED physicians hold significant duties of well-coordinated response informed by emergency operational plan in managing unprecedented disaster and emergency events.¹⁴ Given the crucial role of these healthcare professionals, understanding their knowledge, attitude, and practice in emergency preparedness is imperative in informing policies to guide strategic plans aimed at improving disaster

preparedness and the healthcare systems going into the future.¹⁵ The study aims to assess the knowledge, attitude, and practice of the ED staff toward disaster and emergency preparedness in Saudi Arabia. The study revealed that ED staff had a considerably good familiarity with emergency preparedness with an overall familiarity mean score of 2.43 \pm 1.12; similar to the study conducted by Alshehri which found a satisfactory level of knowledge regarding the preparedness of nursing emergency staff for disaster in the Saudi Arabia.¹⁴

The age and the number of years of experience by the healthcare providers contribute to the wealth of knowledge due to exposure to various emergency situation, training, and changes in preparedness protocols over time.¹⁵⁻¹⁷ The current study findings agree with this assertion; as they found that ED staff aged 35 years and above and those with more than 5 years of clinical experience have significantly higher knowledge about disaster and emergency preparedness than their counterparts in other categories. Female ED staff and those who had more than 3 years of service in ED showed significantly higher knowledge regarding disaster preparedness, which is consistent with Shalhoub et al. who found women working in the ED to be well acquainted with critical skills and approaches for emergency response and preparedness in a health facility.¹⁸

Furthermore, the study found nurses have significantly more knowledge than physicians, which points to the need for enhanced education and training on disaster and emergency preparedness for all ED in the healthcare facility.¹⁹ Regarding the attitude, most of the participants expressed a positive attitude toward disaster management and preparedness with the majority of them approving the necessity of training of all healthcare workers (370 or 90.91%) for purposes of emergency management and preparedness. The findings were reinforced by Alraga who underscored the need for proper training of healthcare professionals for effective and quick management of critical situations as well as reducing the risks to the patients.²⁰ However, a considerable minority 176 (43.35%) of the participants believed that disasters were unlikely to happen in their hospital; which underscores the need for an emergency committee to work on the improvement of the ED staff to become more realistic on the possibility of disasters visiting their facility and to be well prepared for such events; less than one-quarter (64 or 15.69%) of the participants disagreed with the need for performing frequent disaster simulation within the healthcare facilities. Regarding the practice, a notable proportion (199 or 48.54%) of the participants approved the performance of disaster drills in the hospital; which was reinforced by Al-Shareef et al. who reported it as a crucial practice of continuously improving knowledge about disaster preparedness at the health facilities among medic and healthcare professionals.²¹

CONCLUSION

The study's findings highlight the critical role ED staff play in Saudi Arabia's disaster readiness. Despite the general knowledge

of healthcare professionals regarding disaster preparedness, there is a noticeable variation in the attitudes, behaviors, and levels of experience among survey respondents. Emergency department staff must receive ongoing training and skill development to handle a variety of disaster scenarios effectively. The limitations include the unbalanced sample, which includes more nurses than physicians, and the cross-sectional form of the study, which merely establishes relationships rather than causality. Furthermore, the decision to rely only on self-reported data may have been influenced by the psychological or emotional states of the respondents, such as stress or limited time. Future research should involve a more diverse range of healthcare professionals and conduct interventional studies to evaluate the efficacy of specific training programs.

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