

## Research Paper

# Disaster Preparedness: Knowledge, Attitude, and Practice of Hospital Staff



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## ABSTRACT

**Background:** A disaster, as a serious disruption in the functioning of society, may cause extensive damage. Following a disaster, the demand for healthcare increases, and people rush to healthcare centers. In such situations, health staff and medical services play an important role. As a result, people's knowledge, attitude, and practice toward disaster preparedness in the workplace play an important role in accident prevention.

**Materials and Methods:** This cross-sectional analytical descriptive study was conducted to evaluate the level of knowledge, attitude, and practice of hospital staff to prepare for disasters in 2020. A total number of 350 hospital staff working at Shiraz University of Medical Sciences were selected using the cluster sampling method. A researcher-made questionnaire was used to collect the data and SPSS software, version 21 was used to analyze the data.

**Results:** The mean scores for knowledge, attitude, and practice regarding disaster preparedness were  $9.44 \pm 1.53$ ,  $39.26 \pm 4.8$ , and  $7.26 \pm 3.66$ , respectively. In addition, 74.5%, 89.5%, and 29.2% of participants showed good knowledge, attitude, and practice, respectively. There was a significant relationship between knowledge and attitude ( $r=254$ ,  $P<0.001$ ), knowledge and practice ( $r=205$ ,  $P<0.001$ ), and attitude and practice ( $r=161$ ,  $P=0.004$ ).

**Conclusion:** Results revealed a good level of knowledge and attitude and a moderate level of practice in hospital staff in terms of disaster preparedness. It seems necessary to hold both theoretical and practical training programs as well as operational maneuvers with an emphasis on repetition in appropriate intervals.

### Keywords:

Disaster, Hospital staff,  
Knowledge, Attitude, Practice

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## 1. Introduction

Disasters, whether natural or man-made, are increasing globally [1, 2]. According to the World Health Organization (WHO), “a disaster is a serious disruption to the functioning of society that causes widespread human, material, economic, or environmental damage that may be beyond the ability of society to cope with its resources” [3]. According to the 2020 world disaster report, between 2008 and 2019, there were 1231 natural disasters worldwide, affecting nearly 2 billion people in 115 countries [4]. As a result of disasters, many deaths and injuries occur, the demand for health care increases suddenly and uncontrollably, and people rush to health centers and hospitals [5]. In such situations, health and medical staff play a significant role. If only the hospital itself is in disaster, it is an internal disaster, otherwise, it is an external disaster. Disasters can be caused by natural events (such as hurricanes, droughts, earthquakes, and communicable diseases), technology-related events (such as explosions, structural collapse, and radiological events), or civil/political events (such as strikes, terrorist attacks, and biological wars) [3]. Unexpected events have adverse effects on medical centers including delays or lack of proper and timely information, confusion of staff, lack and rapid completion of emergency capacity, lack of equipment and consumable materials, disruption of the normal operation of the medical center due to the breakdown of equipment, facilities and the crowds. These incidents create unique problems that require a different kind of planning than the day-to-day operation of hospitals. Therefore, disaster management and the existence of a complete and codified program in all medical centers are necessary to reduce the effects of the disaster [6]. Considering the occurrence of disasters in different parts of Iran, disaster risk management reducing the damage and its consequences, identification of its infrastructure, and assessment of the ability of all treatment centers are necessary to appropriately plan and deal with disasters [7]. Disaster management is possible if all medical staff are aware of their responsibilities and work as a team under an integrated management system [6, 8, 9]. Given the spread of disaster in the world and the importance and the vital role of hospitals and health care centers in disaster management and treatment of patients, as well as the lack of studies on hospitals staff in Iran, the present study aimed to investigate the level of knowledge, attitude, and practice of hospital staff in Shiraz to prepare them for the disaster.

## 2. Materials and Methods

### Study design and participants

This cross-sectional analytical descriptive study aimed to measure the knowledge, attitude, and practice of hospital staff in terms of disaster preparedness at Shiraz University of Medical Sciences. The inclusion criteria were more than one year of work experience.

### Sample size and sampling method

To determine the sample size, a pilot study was first conducted. In the pilot study, a standard deviation of 4.14 was obtained. Considering a confidence level of 95% and an error of 4, the sample size of 292 people was obtained. Considering a drop rate of 20%, the sample size was considered to be 350. For data collection, the cluster sampling method was used. Based on this method, each hospital was considered as a cluster (17 clusters). Then, 21 people from each hospital were randomly selected and included in the study. Finally, the questionnaire was distributed among them.

### Data gathering tools

The data was collected using a researcher-made four-part questionnaire including demographic information (gender, marital status, education, job, and work experience), knowledge (12 questions), attitude (9 questions), and practice (8 questions). All questions were developed based on an extensive review of the related literature. For instrument validation, in the first step, the questionnaire was sent to 15 professors of Shiraz University of Medical Sciences in the fields of health education and health promotion, environmental health engineering, ergonomics, and occupational health engineering about disaster preparedness. In the second step, experts' comments and opinions were applied to different parts of the questionnaire. Finally, the CVI and CVR tests were used as validation tests. The CVI and CVR tests showed a value of 0.83 and 0.75 respectively. The questionnaire reliability was confirmed by the Cronbach  $\alpha$  test and obtained 0.75. For the Knowledge answers were correct (1 point), wrong and I don't know (0 points). The attitude was measured based on a 5-point Likert scale from strongly disagree (score 1) to strongly agree (score 5). The Disaster preparedness practice was scored yes (score 2), not yet held (score 1), and no (score 0).

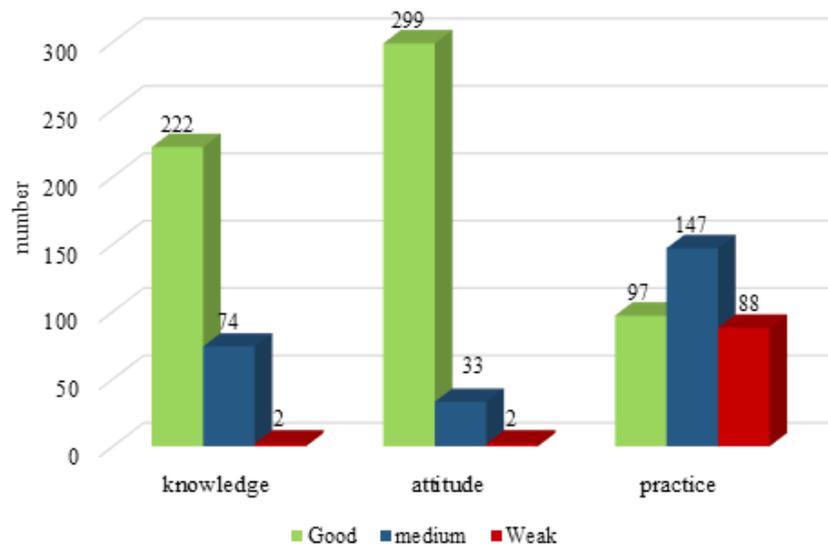


Figure 1. Frequency of knowledge, attitude and practice

### Data analysis

The SPSS software, version 21 was used to analyze the collected data. First, the Smirnov-Kolmogorov test was used to assess the normality of the data. Due to the non-normality of data, Mann-Whitney and Kruskal-Wallis tests were also used.

### 3. Results

In this study, 350 participants completed the questionnaire. The mean age of the participants was  $33.42 \pm 8.04$  years (Table 1), and 65% were women and 62.6% were married, 66% had a bachelor's degree and 46% had a degree in nursing. The mean work experience was  $9.74 \pm 7.26$  years and most of the subjects (60%) had less than 10 years of work experience. The Mean $\pm$ SD for knowledge, attitude, and practice were  $9.44 \pm 1.53$ ,  $39.26 \pm 4.80$ , and  $7.26 \pm 3.66$ , respectively (Table 2). Besides, 74.5%, 24.8%, and 0.7% of participants showed good, moderate, and weak knowledge, respectively, and 89.5% of hospital staff had good attitudes while 9.9% and 0.6% had moderate and weak attitudes, respectively (Figure 1). The percentage of good practice was 27.7%, 42% of participants had medium and 25.1% of them had weak practice. Table 3 indicates the relationship among the knowledge, attitude, practice, and demographic variables. The demographic information did not show a meaningful relationship between knowledge and attitude. The gender of participants had a significant relationship with practice ( $P=0.009$ ) and females had higher scores of practice than men. The marital status of subjects also was meaningfully related to practice ( $P=0.006$ )

and married participants had higher scores than singles. The practice showed different levels ( $P=0.001$ ), and physical protection and technicians had the highest and the lowest scores, respectively. The practice dimension also had a meaningful relationship with work experience ( $P=0.002$ ). Participants with 20-11 years of work experience had the highest scores and those under 10 years of work experience showed the lowest practice. Moreover, the Spearman correlation test showed a significant relationship between knowledge and attitude ( $r=254$ ,  $P<0.001$ ), knowledge, and practice ( $r=205$ ,  $P<0.001$ ), attitude, and practice ( $r=161$ ,  $P=0.004$ ).

### 4. Discussion

The study aimed to determine the level of knowledge, attitude, and practice of the hospital's staff in terms of disaster preparedness at Shiraz city, and 745% of participants showed good knowledge. This outcome was in contrast with Ahayalimudin et al.'s study conducted on emergency nurses and health clinic nurses in Selangor state in Malaysia. They indicated that both groups of nurses had similar inadequate knowledge but a positive attitude toward disaster management [10]. In Nofal et al.'s study that assessed the knowledge, practices, and attitudes regarding disaster and emergency preparedness among the staff of the emergency department, the participants with more than 5 years of experience had a statistically significant ( $P=0.009$ ) knowledge score for disaster and emergency preparedness [11]. The managers of different hospital departments in South Africa were also aware of disaster preparedness and disaster management guidelines that were consistent with this study's result [12]. In Bandar Abbas, the knowledge of hospital staff

**Table 1.** Demographic variables of the study participants

Variables		No. (%)
Gender	Male	120(34.3)
	Female	230(65.7)
Marital status	Single	130(37.1)
	Married	220(62.9)
Education	Under diploma	39(11.1)
	Diploma	15(4.3)
	Bachelor	231(66)
	Masters	48(13.7)
	PhD	17(4.9)
	Doctor	5(1.4)
Job	Nurse	161(46)
	paramedic	12(3.4)
	Official	131(37.4)
	Technician	19(5.4)
	Services	15(4.3)
	Physical protection	7(2)
Work experience (y)	>10	210(60)
	20-11	114(32.6)
	20<	26(7.4)

about disaster preparedness needed to be strengthened to improve self-efficacy during disaster management [13]. Also, the knowledge of disaster management and disaster preparedness was low or moderate in 93.9% of final-year nursing students and more than 80% of nurses, respectively [14]. Furthermore, in other similar studies

[5, 15, 16] on health center workers in Dehloran, Saudi Arabia, and Japan, participants had inadequate knowledge about disaster preparedness. About 90% of staff had a good attitude toward disaster preparedness which was consistent with the results of Khan et al.'s study on nurses in Lahore [17]. Moreover, participants had a posi-

**Table 2.** Possible range, observed range, the Mean±SD of knowledge, attitude and practice

Variables	Possible Range	Observed Range	Mean±SD
Knowledge	0-12	3-12	9.1±44.53
Attitude	9-45	13-45	39.4±26.80
Practice	0-13	0-13	7.3±23.66

**Table 3.** The Mean±SD of knowledge, attitude and practice in terms of demographic variables

Variables	Knowledge			Attitude			Practice			
	Mean±SD	Middle	P	Mean±SD	Middle	P	Mean±SD	Middle	P	
Gender	Male	48.1±41.9	10	0.641	86.4±80.38	41	0.142	65.3±99.7	8	0.009
	Female	56.1±47.9	10		76.4±49.39	41		88.6±61.3	6	
Marital status	Single	42.1±40.9	10	0.336	95.4±77.38	39	0.134	59.3±53.6	6	0.006
	Married	60.1±48.9	10		70.4±54.39	41		68.7±64.3	8	
Education	Under diploma	47.1±41.9	10	0.322	51.39±16.4	41	0.138	41.4±25.7	7	0.128
	Diploma	35.1±9	9		40±32.4	41		93.6±18.4	7	
	Bachelor	59.1±39.9	10		53.4±03.39	40		52.3±22.7	7	
	Masters	86.9±23.1	10		87.39±57.6	42		56.3±22.8	9	
	PhD	66.1±37.9	9		93.3±52.39	40		96.2±43.5	5	
Job	Doctor	78.1±20.10	11	0.474	42±23.2	42	0.287	72.4±40.6	8	0.01
	Nurse	62.1±37.9	10		99.38±71.4	41		48.3±22.7	6	
	Paramedic	62.9±30.1	9.5		96.4±87.38	40		27.8±26.4	7	
	Official	51.9±41.1	10		50.39±10.5	41		63.3±08.7	5	
	Technician	70.9±21.1	10		64.3±15.40	42		55.5±5.3	11	
	Services	65.1±50.9	10		95.4±42.37	50.38		45.4±33.9	9	
	Physical protection	86.1±33.8	8.5		50.41±10.3	50.42		68.2±20.11	13	
Work experience (y)	>10	46.1±36.9	10	0.180	44.4±01.39	40	0.086	77.3±72.6	6	0.002
	20-11	69.1±55.9	10		76.39±34.5	41		27.3±23.8	8	
	<20	72.9±35.1	10		10.5±08.39	41		56.7±48.3	8	

tive attitude toward disaster preparedness same as the managers of different wards of the hospital in Moabi et al.'s study [12]. Also, the mean attitude score for hospital staff at Dehloran city was 23.27, and 89.39% of them had a positive attitude toward disaster preparedness [5]. Although in Yemeni health professions, the attitude among different jobs was not statistically significant, technicians and physical protection showed a higher score. The level of attitude regarding disaster planning among them was statistically different and medical teachers appeared higher in attitude to disaster management [8]. The find-

ings also elicited that the participant practice in disaster preparedness was moderate (7.26±3.66). Although the knowledge and attitude of most of the employees were at an acceptable level, they need appropriate practical and training programs in terms of their practice.

In the current research, demographic information was not related to knowledge and attitude dimensions that were consistent with Munasinghe et al.'s study. They found that gender, work experience, and job type were not attributed to disaster preparedness [1]. Jourvand et

al.'s study also showed the same results [5]. While education level was a key factor in the knowledge level of Yemeni health professionals. Yemeni Physicians were better in knowledge than other subgroups of health specialties [8].

In contrast with knowledge and attitude, demographic information was attributed to the practice of participants in the current research. Females and married participants showed better practice than men.

Participants with 11-20 years of work experience had the highest score of practice. Moreover, physical protection and technicians had the highest and the lowest scores, respectively.

In addition, the trained staff mentioned that they knew what to do during the disaster regarding their role and their received training but, the rest of them did not know about the required actions due to a lack of received training and unspecified roles during disaster management. In Khan et al. [17] and Ahayalimudin et al.'s [10] studies, nurses had sufficient practice and were consistent with the present results. In contrast, in Saudi, Bandar Abbas, and India, EMS students, health care workers, and medical internship students showed poor performance, respectively. They stated that they were not prepared to respond to the disaster [3, 15, 18]. Also, in Moabi et al.'s study, the practice of individuals was defective and the staff required firefighting training, practice, and periodic review of instructions [12]. One reason for the inconsistency of some of the above studies with the present study was the staff's lack of motivation to participate in disaster preparedness programs due to the high workload. Also, due to the lack of operational maneuvers and experience, individuals have low practice in dealing with disasters. Different factors such as studied areas, environmental and regional conditions, type of hospital, and how to develop and implement training programs related to disaster preparedness can affect these differences.

Some studies on health professionals propose some actions to enhance their preparedness against disasters. In Adams et al.'s study, nurses acknowledged that some barriers affect their availability for work following a disaster, and the right solutions should be considered for them [19]. Cotanda et al. reported that the implementation of training programs improved the knowledge of pediatric emergency department staff [20]. Gowing et al. did a systematic review of health professionals and support staff in terms of disaster preparedness. They reported that health professionals and support staff may not be fully prepared for disasters. They emphasized

that the whole healthcare team, including allied health professionals and support staff, needed more attention for both internal and external disasters [21]. Khankeh et al. reported that the establishment hospital incident command system can improve the hospitals' preparedness at times of disasters in many aspects [22]. Sawano et al. proposed that the potential health impact of hospital evacuation during disasters should be considered in the disaster preparedness policies, pre-planning, training, and pre-testing of these plans [23]. Moreover, the results of a systematic review showed that developing educational and training programs to strengthen the knowledge and skills of nurses for disaster preparedness is necessary [24].

## 5. Conclusion

In this study, the knowledge and attitude of participants in terms of disaster preparedness were at a good level. They showed moderate practice. In addition to disaster preparedness policies, using theoretical and practical training programs and operational maneuvers is necessary to improve their practice. Moreover, developing educational and training programs to strengthen the knowledge and skills of the hospital's staff is a key element.

Regarding the low sample size as a limitation, it is suggested that future studies consider a bigger sample size. Another limitation was using a questionnaire. It is suggested that future studies try to measure the performance of individuals in practice by holding operational maneuvers.

## Ethical Considerations

### Compliance with ethical guidelines

In this research, written consent was obtained from all participants. Due to the non-interventional nature of the study, the ethics code was not assigned to the research committee.

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### Authors' contributions

Conceptualization and supervision: Mehdi Jahangiri and Zahra Motlagh; Methodology: Mehdi Jhangiri, Fateme Omidvari and Raziye Janizadeh; Investigation, writing – original draft, review & editing: All authors; Data col-

lection: Fateme Omidvari and Raziye Janizadeh; Data analysis: Fateme Omidvari, Zahra Motlagh.

### Conflict of interest

The authors declared no conflict of interest.

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