

# Emergency Nurses' Requirements for Disaster Preparedness

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## Abstract

**Background:** Natural and man-made disasters affect people, communities, and health systems. Nurses play a key role in the health system and must be prepared for appropriate response in disasters.

**Objectives:** This study was done to assess the current knowledge of nurses in emergency departments for disaster preparedness.

**Patients and Methods:** This cross-sectional study was conducted on 110 emergency nurses working in teaching hospitals affiliated to the Iran University of Medical Sciences, Tehran, Iran. A questionnaire was used to collect data and the data were then analyzed using descriptive and inferential statistics with SPSS software version 16.0.

**Results:** Based on the findings, most of the participants (64.5%) were aged 30 - 39 years old. 84% of the cases were female and 97.3% had a bachelor's degree. The average perceived knowledge of nurses was  $2.43 \pm 1.01$ . The nurses had the highest familiarity with triage and lowest knowledge in epidemiology and decision-making.

**Conclusions:** Lack knowledge of nurses regarding response to disaster situations indicates inefficiencies in the current system. Therefore, it is recommended to organize more workshops, annual training courses, and maneuvers based on staff needs and formulate continuous education courses for nurses.

**Keywords:** Needs Assessment, Education, Emergency Department, Knowledge, Disasters, Emergency Preparedness, Nurse Staff

## 1. Background

Advancements in technology and industrialization increase the rate of natural and man-made disasters (1, 2). In 2014 alone, 202 disasters were recorded in Asia affecting 87760054 and injuring 10,107 people (3). Iran is vulnerable to a range of natural and man-made disasters (4, 5) and the capital Tehran is not an exception. It is located on active faults; earthquakes with high severity are expected (6). Moreover, man-made hazards such as oil and gas reservoir tank explosions (7), rising immigration to Tehran, presence of factories, and high population density can result in significant losses and casualties from disasters in this megacity (6).

The health care system plays a very important role in helping communities following disasters (8). After disasters, destruction and heavy damages to the healthcare infrastructures, buildings and management system are expected, which may result in death and injuries (9-12). The population in affected areas expect an efficient and timely response from the health care system. Nurses play a key role in the system (13) and must be prepared for appropriate response to disasters and crises (14-17).

Previous experiences and trainings of nurses affect their preparedness, increase their awareness, self-confidence and skills in disaster response and decrease

their vulnerability to unpredictable events (18-23). Studies show that most nurses are not ready to face mass casualties, and their preparedness, education and skills are not adequate for an appropriate response (15). Accordingly, the first step is to determine priorities and training needs of Emergency Department (ED) nurses as the front line responders (24, 25). This study sought to assess this issue.

## 2. Objectives

This study was performed to assess the current knowledge of nurses in EDs for disaster preparedness.

## 3. Patients and Methods

This cross-sectional study was conducted in teaching hospitals affiliated to Iran University of Medical Sciences in 2014. The study population ( $n = 460$ ) included nurses in the EDs of 8 hospitals. With a confidence coefficient of 95% and a testing power of 90%, 110 participants were recruited using convenient sampling. The inclusion criteria were: employment in ED for at least six months, and having a bachelor or higher degree in nursing. Questionnaire completion was voluntary and anonymous. Those who volunteered, filled and signed consent forms.

A two-part questionnaire was used to collect the data. The first part covered demographic information of the nurses including age, sex, married status and work history. The second part consisted of 42 questions. In this questionnaire, knowledge and training needs of nurses in disaster response were examined in 8 domains namely: triage, communication, biological agent, decontamination, quarantine, isolation, reporting and accessing critical resources, psychological issues and vulnerable population, epidemiological and clinical decision and incident command system (ICS) (26, 27). A five-point Likert scale (1 = not familiar/very poor, 2 = poor/familiar, 3 = fair/familiar, 4 = good/familiar, 5 = very familiar/very good) was used to measure knowledge. The questionnaire was adapted from the studies of Wisniewski et al. (26). Translation and back-translation were used to develop a Persian version of the questionnaire. To test the validity, the instrument was reviewed by the research team and 15 experts. A pilot study was conducted with a sample (n = 30). The Cronbach's Alpha test indicated that items were internally consistent ( $\alpha = 0.92$ ). The nurses entered the study with their own consent and they filled out and signed the consent form. The final instrument had 42 questions. The questionnaire was completed in the wards and the completion of questionnaire took around 30 minutes.

Questionnaires were distributed among the nurses by one of the researchers. Data were analyzed using SPSS version 16.0. Results are expressed as frequency, mean and standard deviation and inferential (Pearson correlation coefficient and independent t-test) statistics.

#### 4. Results

Most of the participants were aged 30 - 39 years-old. Eighty-four percent of the nurses were females and 97.3% had a bachelor's degree. Only three participants had a post-graduate degree. Also, 59 nurses had less than five years experience in EDs (Table 1).

The average perceived knowledge of nurses was  $2.43 \pm 1.01$ . The nurses had the highest familiarity with triage ( $2.77 \pm 0.86$ ). They had the highest knowledge in basic first aid in large-scale disasters, administering oxygen and artificial respiration with a mean of  $2.97 \pm 1.12$  and the lowest familiarity in assessing the effectiveness of their activities in responding to the large-scale disasters ( $2.55 \pm 1.02$ ). Epidemiology and decision-making obtained the lowest score ( $2.47 \pm 0.82$ ). In this domain, general issues related to mass casualty management in large-scale disasters (ethical, cultural, legal and safety issues) and ability to identify the underlying disease resulting from exposure to chemical, biological and radiological agents obtained  $2.52 \pm 1.13$  and  $2.39 \pm 1.05$ , respectively (Table 2).

**Table 1.** Distribution of the Participants' Demographic Characteristics<sup>a, b</sup>

Variables	Values	Mean $\pm$ SD
<b>Age, y</b>		33.15 $\pm$ 6.07
< 30	25 (22.7)	
30 - 39	71 (64.5)	
> 40	14 (12.7)	
<b>Gender</b>		-
Female	93 (84.5)	
Male	17 (15.5)	
<b>Academic degree</b>		-
BS	107 (97.3)	
MS	2 (1.8)	
PhD	1 (0.9)	
<b>Experience in nursing, y</b>		8.59 $\pm$ 5.59
< 5	24 (21.8)	
6 - 10	45 (4.09)	
11 - 15	27 (24.5)	
16 <	14 (12.7)	
<b>Experience in ED, y</b>		5.20 $\pm$ 3.68
< 5	59 (53.6)	
6 - 8	32 (29.1)	
9 <	19 (17.3)	

<sup>a</sup> Abbreviations: BS, Bachelor of Science; ED, Emergency Department; MS, Master of Science degree; PhD, Doctor of Philosophy degree.

<sup>b</sup> Values are presented as No. (%).

**Table 2.** Familiarity and Knowledge of Nurses in Different Fields of Disaster Preparedness<sup>a, b</sup>

Domain	Mean $\pm$ SD
<b>ICS</b>	2.51 $\pm$ 0.84
<b>Triage</b>	2.77 $\pm$ 0.86
<b>Communication</b>	2.58 $\pm$ 0.90
<b>Psychological domain and vulnerable groups</b>	2.50 $\pm$ 0.92
<b>Decontamination, quarantine and isolation</b>	2.58 $\pm$ 0.86
<b>Epidemiology and clinical decision</b>	2.47 $\pm$ 0.82
<b>Reporting and accessing critical resources</b>	2.59 $\pm$ 0.89
<b>Biological factors</b>	2.49 $\pm$ 0.85
<b>The average total perceived knowledge</b>	2.43 $\pm$ 1.01

<sup>a</sup> Abbreviation: ICS, incident command system.

<sup>b</sup> n = 110.

#### 5. Discussion

Researchers believe that formulating a comprehensive plan for disaster response must assess, training needs of

individuals be (25, 27). This study surveyed nurse's educational needs in response to disasters and found a moderate response in disaster preparedness knowledge.

There was no relationship between nurses' demographic data (age, gender and their experience in ED) and their level of knowledge. Emergency nurses obtained the highest score in triage and lowest score in epidemiology and clinical decision making. As triage is performed in the daily activities of nurses in EDs, they have appropriate information regarding it.

Despite the establishment of disaster committees in hospitals, nurses are unfamiliar with ICS, reporting methods, and access to data resources. Wisniewski et al. (26) found that knowledge of nurses in disaster preparedness was lower than expected. Although nurses knew triage they had the lowest familiarity with communication. Similar results were obtained in the study of Garbutt et al. (27).

In a study conducted by Worrall (28), nurses obtained the highest scores in biological agent and lowest scores in ICS. McKibbin et al. (29) also showed that familiarity of nurses in disaster preparedness were in low. The nurses had little knowledge regarding epidemiological and biological agents. The studies of Al Khalailah et al. (16) in Jordanian and O'Sullivan et al. (18) showed difficulty of nurses in dealing with mass casualties.

Lack of cooperation of two teaching hospitals and nurses' refusal to participate in the study (due to work) were limitations. These factors can affect the generalizability of the results.

As the health care system in Middle East countries are nearly the same (2, 30), the findings of this study are similar in these countries and the must opt to appropriate policies to deal with crises. Organizing annual training courses and maneuvers based on staff needs are appropriate strategies for preparedness of medical centers. Continuing education should be held for the nurses. Bioterrorism agents, use of personal protective equipment, epidemiology, psychological first aid, disaster management processes, mass casualties management and command systems are the required fields for education. Scenario-based drills and exercises are also suggested. Moreover, establishing a formal curriculum in mass casualty and disaster management to improve knowledge and skills in all nurses are essential.

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## Footnotes

**Authors' Contributions:** Zahra Abbasi Dolatabadi: Data gathering, data analysis, and article adjustment. Hesam Seyedin: Drafting of the manuscript. Fatemeh Rajabifard: Data analysis and article adjustment.

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