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Original Article

Hospital Nurses' Disaster Competencies

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Abstract

Background: Natural and man-made disasters have significant effects on the physical, psychological, and emotional health of society. Nurses play an essential role in disaster management. Therefore, nurses should have specific core competencies to provide care for affected people during disaster situations.
Objectives: This study aimed to assess hospital nurses' disaster competencies in such situations.
Methods: This cross-sectional, descriptive study was conducted using a self-report questionnaire that included 50 questions on NCDS (Nurse Competence Disaster Scale) in four domains. The questionnaires were distributed among 142 nurses working in three teaching hospitals in Kerman, Iran, in 2018.
Results: The average percentage scores of nurses on their responses to questions in the domains of management, ethical aspects, personal aspects, and technical aspects of disaster competencies were 39.76%, 19.53%, 32.02%, and 75.06%, respectively. In multiple regression analysis, nurses' participation in maneuvers and their work experience exerted the strongest influence on disaster nursing core competencies. Nurses who had practice during maneuvers had higher competency scores by 19.63 units than those who had no practice (p=0.0001). Moreover, the competency scores of nurses with more than 11 years of work experience were higher by 11.42 units than the others (p=0.0001).
Conclusion: According to the results of the current study, strategies such as disaster drills and continuing education programs need to be developed for nurses to improve their disaster core competency.

Keywords: Nurse, Competency, Incidents, Disasters.

Introduction

Natural and man-made disasters are frequent worldwide phenomena that overwhelm local capacities and cause significant loss of life, economic losses, and environmental damage (1, 2). Unexpected events and disasters occur with no respect for borders (3); no country and no person in the world is immune from their consequences (4). Every year, nations face such incidents and suffer from their subsequent casualties and financial losses (5). During the past thirty years, the frequency of disasters and the severity of the resulting damage have gradually increased, and the number of injured people were involved two or three times (6). In 2015, the mean of disaster occurrence was reported as 376, where the number of deaths and number of people affected by disasters were 22,765 and 110.3 million, respectively (7). Asia seems to be the most vulnerable continent for floods and storms, with 44% of all disaster events, 58% of total deaths, and 70% of total number of people affected (8). Iran is susceptible to various geological and climatic hazards (9). In 2015, the International Disaster Database (EM-DAT) reported that earthquakes and floods are the most prevalent types of hydrometeorological hazards in Iran and cause significant loss of life and economic losses (10).

Hospitals are very important in the healthcare system and in disaster management (11). In unexpected events, hospitals need to have expert and trained personnel (12). The World Health Organization (WHO) has asked all governments to train and educate all healthcare workers for disaster preparation (13). Nurses have been the pioneers of medical care throughout the wellness and illness continuum. Thus, it is imperative that they be comprehensively familiar with all aspects of disaster and emergency care (14, 15). The range of recent disasters worldwide indicates the need to improve nurses' competencies in disaster response. Competency is

defined as a combination of knowledge, skills, abilities, and behaviors needed to perform a specific task or job (13). Lack of competency and preparedness can lead to inadequate performance by nurses in caring for disaster victims (16). Thus, nurses should develop competencies before disasters in order to respond effectively after them (17, 18). Nurses who are prepared and trained for disaster management cope better than those without preparation when disasters occur (4). Managers should regularly evaluate nurses' disaster competencies to achieve effective preparation (19).

Despite previous research and efforts to improve disaster nursing competencies, many studies have reported that there are clearly gaps to be filled in disaster preparedness and core competencies in nurses (20,21,4,22,13,23-26), demonstrating that training and education in the field of disaster nursing is weak and the nursing curriculum must be revised (27). A lack of competency in nurses can lead to an unsuitable performance in the care of disaster victims (28). Thus, it is essential that the gaps in their knowledge and skills be identified and addressed in order to prepare nurses for disaster situations (29). There have been very few studies regarding disaster nursing competency conducted in Iran.

Objectives

The current study aimed to evaluate disaster competency among nurses and to identify factors associated with disaster readiness.

Materials and Methods

Study design, sample, and setting

This descriptive and cross-sectional study was carried out from January through March, 2018, using a self-reporting questionnaire in teaching hospitals affiliated with Kerman University of Medical Sciences. Convenience sampling was used to recruit participants in Kerman, Iran. A total of 142 nurses in medical, surgery, emergency, and other working units were recruited from three educational hospitals of Kerman (Bahonar: 45, Shafa: 52, and Afzalipour: 45). The inclusion criteria for the participants were an interest and willingness to participate in the study and a bachelor's degree in nursing. Exclusion criteria included unwillingness to participate in the study and failure to complete the questionnaire. The sample size was determined by the number of participants required to maintain the statistical power for a correlational study. In order to achieve a power of 0.80 at the 0.05 significance level (two-sided), a minimum of 85 participants was required. As many participants as possible were recruited in the current study.

Instrument and data collection

A two-part questionnaire was used to collect data. The instrument consisted of two sections. The first part covered demographic data of the participating nurses, including gender, age, work experience in nursing, and education level. Questions inquiring whether participants had experienced past events or participated in disaster drills were also included. The second part consisted of 50 questions. In this section, the competency of nurses in disaster response was examined in 4 domains, namely: management (12 questions), ethical aspects (9 questions), personal aspects (6 questions), and technical aspects (23 questions). Questions were scored on a five-point Likert scale (from 5 = very high to 1 = very low), except for the ethical aspect of competence which had 4 options (from 4 = always to 1 = rarely). Total scores ranged from 50 to 244, with a higher score indicating a more positive disaster competency. The questionnaires were completed by the self-reporting method. This questionnaire was first designed in Iran by Ali Akbari et al., to assess the competency of nurses in disaster response. It had good validity and reliability; the total of Cronbach's alpha coefficients was 0.962 (30). To test the validity, the instrument was reviewed by the research team and 10 experts. A pilot study was conducted with a sample group (n=30). The Cronbach's Alpha test indicated that items were internally consistent (α=0.92).

The purpose and procedures of this study were explained to ward managers and all participants. Then the questionnaires were distributed to nurses at their workplace. Instructions on how to complete the questionnaire were attached to each one. The completed questionnaires were placed in sealed envelopes and returned to the researcher directly. Data was collected from January 1, 2018 through March 1, 2018. Nurses were informed that their participation was voluntary and their refusal to participate would have no negative consequences. All data was kept anonymous and confidential throughout the study.

Data analysis

Data was analyzed using SPSS version 21. Results were expressed as descriptive and analytic statistics. Descriptive statistics were used to describe the demographic data and competency scores of nurses. Multiple linear regression was

used to identify associations between variables and nurse's competency. The significance level was set at 0.05.

Ethical considerations

Before the study was begun, ethical approval was obtained from the university where it was conducted under code no: 1397.228. Written consent was obtained from each participant.

Results

Demographic characteristics of nurses

A total of 142 nurses responded to the questionnaire. The majority were aged less than 25 years (44%). Most respondents had a bachelor's degree. Also, 65 (45/8%) nurses had experience in disaster situations, and 52 nurses had attended training courses (maneuvers). Table-1 shows the demographic characteristics and competency scores of the respondents.

Table-1. Nurses demographic characteristics and competency scores

Variable		Number (percentage)	Score of competency Mean + SD	P-Value
Age	<25	63 (44.4)	159.69 ± 24.09	0.01
	26-30	25 (17.6)	156.62 ±29.09	
	30-35	18 (12.7)	163.72 ±22.90	
	>36	36 (25.4)	168.41 ± 27.22	
Education Level	Bachelor	136 (95.8)	166.70 ±26.74	0.81
	Master	6 (4.2)	159 ± 25.79	
Gender	Woman	126 (88.7)	164.61 ±25.57	0.06
	Man	16 (11.3)	163.40 ±36.61	
Working unit	Emergency unit	33 (23.2)	164.35 ± 28.12	0.04
	Other units	109 (76.8)	173.06 ± 20.05	
Experience of the past events	Yes	65 (45.8)	174.61 ± 28.21	<0.0001
	No	77 (54.2)	159.42 ± 23.67	
Participation in maneuvers	Yeas	52 (36.6)	180.01 ± 29.64	<0.0001
	No	90 (63.4)	158.50 ± 21.23	
Working experience	<5	78 (54.9)	161.12 ± 25.04	0.01
	5-10	24 (16/9)	165.62±24.82	
	≥11	40 (28/2)	177.07±28.19	

Nurses' competency

The total mean score of competency was 166.38 with a standard deviation of 26.66. The scores for management, ethical, personal, and technical aspects were categorized as good, moderate, or poor with the percentage of correct responses for the category being > 70%, 45–70%, and < 40%, respectively.

The scores for the management domain ranged from 12 to 60, and the mean score was 39.76 (moderate). The scores for the ethical domain ranged from 6 to 24, and the mean score was 19.53 (good). The scores for the personal domain ranged from 9 to 45, and the mean score was 32.02 (good). The scores for the technical domain ranged from 23 to 115, and the mean score was 75.06 (moderate). Table 2 depicts the scores of nurses' competency in different domains.

Table-2. Scores of nurses' competency in different domains

Domains	Mean + SD
Management	39.76±7.44
Ethical	19.53±3.17
Personal	32.02±5.70
Technical	75.06±14.39

Associations between nurses' competency scores and background factors were explored using linear regressions analysis. The results of single-variable regression revealed a significant relationship between age and competency score (p=0.001). The competency scores of nurses over 36 years of age were 18.16 units more than those 25 years of age or younger. Having more than 11 years of work experience increased the participants' competency scores by 15.94 units.

There was a significant relationship between the presence of nurses in disaster situations and their competency scores (p=0.001). Similarly, nurses who prior training in disaster relief work had scored higher than those who did not.

The multiple variable linear regression revealed a significant relationship between nurses' participation in maneuvers and work experience with competency score. Nurses who had participated in maneuvers had competence scores that were higher by 19.63 units than the reference group. Also, nurses who had more than 11 years of work experience had higher competency scores by 11.42 units than the reference group. The associations between variables and competency scores determined using linear regression are presented in Table-3.

Table-3. Associations between variables and nurses competency by using regression

Variable		Crude regression coefficient	Crude P-value	Adjusted regression coefficient	Adjusted P-value
Age	≤25	Ref	-	-	-
	26-30	8.9	0.14	3.11	0.64
	30-35	4.02	0.55	4.01	0.71
	≥36	18.16	0.001	8.02	0.48
Working experience	<5	Ref	-	-	-
	5-10	4.49	0.45	0.78	0.88
	≥11	15.94	0.001	11.42	0.16
Gender	Woman	Ref	-	-	-
	Man	15.63	0.02	6.93	0.32
Working department	Other	Ref	-	-	-
	Emergency	7.8	0.09	2.74	0.58
Experience of the past events	No	Ref	-	-	-
	Yes	15.18	0.001	2.79	0.56
Participation in maneuvers	No	Ref	-	-	-
	Yes	21.51	0.001	19.61	0.0001
Education Level	Bachelor	Ref	-	-	-
	Master	-7.7	0.48	-6.93	0.51

Discussion

Nurses play a key role in disaster management (31). Previous studies have reported that nurses have a poor level of readiness for disaster response (32). The present study was carried out to assess the competency of nurses working in educational hospitals of Kerman during incidents and disasters. The results demonstrated that the total mean score of competency was 166.38. The results also showed that there were associations between nurses' competency and gender, work department, participation in maneuvers, and experience with past events.

Based on this study, the total mean competency score was 166.38. These results were similar with those of a previous study. Ali Akbari et al. concluded that nurses had poor knowledge concerning disaster preparedness (25). In O'Leary's study, nurses' competency level was excellent, and the overall mean competence score was 85.29 ± 12.01 (33). Nasrabadi et al. showed that nurses' ability in triage was at an unacceptable level (15). In the study of Shahabinejad et al., the level of awareness of nurses in dealing with nuclear incidents was poor (34). The current findings showed that competences scores were at a moderate level, because after the Bam earthquake, nurses became more involved in planning for disasters and better understood disaster preparedness.

The results of this study showed that the competency score of male nurses was 15.63 units higher than that of the female participants. Similar results were achieved by Ali Akbari et al. There was a significant difference between the reported competency scores of male and female nurses (25). In the study by Mirzaei et al., male nurses had higher clinical skills under critical conditions than female nurses (35). In the

study by Li et al., the knowledge reserve of male nurses was higher than that of female nurses (36). The current findings are consistent with the results of previous studies. This finding may be explained by the fact that male nurses exhibit physical fitness, endurance, and other physiological advantages, especially when faced with harsh field conditions, heavy loads, and intensive and long-term work.

The current findings also showed that the competency scores of nurses in the emergency department were 8.7 units higher than others. Koponen and Meretoja obtained similar results (37). Erboun et al. indicated that nurses in hospital emergency departments can play an important role in disaster situations by triage and life-saving interventions (38). This reported result is consistent with the present study. Ali Akbari et al. found that it is essential for emergency nurses to acquire clinical and special skills for disaster situations (29). Similar results were obtained by Alzahrani and Kyratsis (39). In the study by Hassankhani et al., emergency room nurses were not prepared to respond to biological incidents (40). Emergency room nurses have high performance due to being more familiar with the relief and rescue process in daily activities.

The ability to respond in a disaster is related to the training and previous experience of nurses (41). The current results showed that participation in maneuvers and exercise programs has enhanced nurses' readiness. According to a report by Salonen et al., nurses who participate in disaster drills gain adequate practical experience and psychological endurance (42). In a study by Al Khalaileh et al., nurses showed weakness in the level of preparedness for a disaster (43). Sham et al. reported that nurses in community clinics need to gain knowledge and skills by involving themselves in disaster planning and drills (44). Disaster drills and exercises enable nurses to realize the importance of improving disaster rescue abilities and to enhance their awareness and motivation to learn.

Prior experience and training affected nurses' abilities to respond to disasters (45). In the current study, nurses' disaster-related experience was found to influence disaster competencies. The experience of working in previous events played a key role in handling critical situations (46). Park et al. found disaster-related experience exerted the strongest influence on disaster core competencies, followed by disaster-related knowledge. This result is consistent with the present study (47). Ali Akbari et al., however, found that the competency of nurses who had previously participated in earthquake or flood responses was at a moderate level (29). The experience of nurses in a previous disaster helped them to be more successful in trauma care, triage, and life-saving.

The current study has a number of limitations: 1) nurses' competency was assessed through self-reporting; 2) using another method (objective structured clinical examination) may elicit different results. Therefore, the results of this study are not generalizable.

Conclusions

This study identifies the need to encourage nurses to acquire disaster competency. Disaster nursing competencies are an important part of the nursing profession. According to the current findings, management and technical competencies were at a moderate level, and ethical and personal competencies were at a good level. Considering the importance of these competencies in disastrous situations, it seems necessary to enhance the knowledge and skills of nurses through participation in educational programs, continuous education courses, and annual maneuvers. Such programs can minimize the damages caused by natural and man-made incidents and disasters.

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Authors' Contribution

All authors pass the four criteria for authorship contribution based on the International Committee of Medical Journal Editors (ICMJE) recommendations.

Conflict of Interests

The authors declared no potential conflict of interests with respect to the research, authorship, and/or publication of this article.

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