

# The Effect of the Implementation of the National Program for Hospital Preparedness on the Readiness of Nurses Under Simulated Conditions of Incidents and Disasters



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## ABSTRACT

**Background:** Nurses are the largest group of health care providers to the injured people and promoting their preparedness is among the basic principles of health management in incidents and disasters. This study was conducted to investigate the effect of the implementation of the national program for hospital preparedness on the readiness of nurses under simulated conditions of incidents and disasters.

**Materials and Methods:** This quasi-experimental study with pretest-posttest design was conducted on the head nurses of Madaen Hospital in Tehran who were selected by total count sampling method. To collect data, demographic and disaster preparedness and response questionnaires were used, which consisted of three parts: knowledge, attitude, and performance. The intervention program was conducted in the form of a 2-day workshop of disaster management along with toptable exercise. Then preparedness of nurses were measured before and one month after the intervention. Data analysis was done with SPSS 18 and descriptive and inferential statistical tests were performed. Significant level was considered at less than 0.05.

**Results:** There were no significant differences between the two groups of intervention and control with regard to the average scores of knowledge ( $P = 0.55$ ), attitude ( $P = 0.633$ ), and performance ( $P = 0.836$ ) before the intervention. After the intervention, the average scores of knowledge ( $P = 0.007$ ), attitude ( $P = 0.0001$ ), and performance ( $P = 0.0001$ ) in the intervention group were significantly higher than those of the control group. The results also showed that after the intervention, the average test scores of knowledge ( $P = 0.009$ ), attitude ( $P = 0.0001$ ), and performance ( $P = 0.0001$ ) in the intervention group increased significantly compared to their pretest scores, while the average scores of knowledge ( $P = 0.170$ ), attitude ( $P = 0.200$ ), and performance ( $P = 0.341$ ) for the pretest and posttest of the control group did not differ significantly.

**Conclusion:** The results of this study showed that education of national hospital preparedness program under simulated conditions of incidents and disasters increased knowledge, attitude, and performance (preparation) of nurses in response to the incidents and disasters.

## Keywords:

Readiness, Nurses, Education

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## 1. Introduction

Unexpected disasters and incidents are circumstances in which the means and resources needed to have a normal life, fail to carrying out its normal function as a result of a natural or man-made catastrophe and the devastating effects of the incident destroys the ability of a society in meeting health care needs and demands [1]. Every year, incidents and disasters impose huge loss of lives and property damages to states and nations. In 2010, approximately 385 natural disasters occurred in 131 countries that took the lives of more than 297000 people of the world and led to a loss of 124 billion dollars [2]. Iran has the fourth place in Asia after India, China, and Bangladesh and the sixth place in the world among those damaged by disasters and based on the Global Assessment Report on Disaster Reduction, Iranian threat level has been estimated to be 8 out of 10 with respect to natural disasters [3].

In the event of incidents and disasters, hospitals and comprehensive health centers are among the first units that their timely provision of optimal health services can have a vital and decisive role in reducing mortality and rescue of the injured [4]. One of the major concerns in determining the readiness of hospitals in unexpected disasters is the potential of their employees [5]. Preparedness is the most effective method to meet the created needs [6]. With regard to the increasing number of occurrences and the consequences of disasters and the special role of health care before, during, and after the occurrence of such events, proper preparation of health care providers is also very necessary and nurses as the largest provider of health care services are often the first health care providers to the affected people [7-9]. Research studies indicate that nurses are neither trained adequately nor prepared to perform their duties in such circumstances [10, 11].

Nasrabadi et al. reported on the lack of knowledge and readiness as the basis for creating the emotional pressures in the exercise of nurses' duties under such difficult circumstances [11]. Therefore, the most important topic that authorities in charge of health care provider organizations should always be considered to reduce the effects of disasters along with the readiness of hospitals is preparing readiness and training programs for hospital staff to perform their duties in this regard [12, 13]. This study was conducted to investigate the effect of national hospital preparedness program on nurses' preparedness under simulated conditions of incidents and disasters.

## 2. Materials and Methods

The current study is a quasi-experimental study with pretest-posttest design which was conducted in 2016. The study population comprised executive managers, nursing directors, and members of incidents and disasters' risk management committee of Madaen and Dey hospitals which were enrolled in the intervention and control groups, respectively. Sampling was conducted with total count method in which 27 of subjects from Madaen Hospital were recruited in the intervention group and 23 subjects from Dey Hospital in the control group. Those subjects were selected who were willing to participate in research and had a bachelor and higher degree in Nursing.

Absences more than once from training sessions and failure to complete the posttest and pretest questionnaires were the exclusion criteria. National hospital preparedness program under simulated conditions of incidents and disasters was implemented in the form of a 2-day workshop. On the first day, principles and concepts of risk, risk analysis, preparedness planning process, the early warning system and hospital incident command system and on the second day, the early warning system and advanced hospital incident command were taught. At the end of the second day, incident scenario was explained and tabletop exercise was administered to establish and evaluate the participants.

To review and evaluate the readiness of nurses, we used the disasters preparedness and response questionnaire of nursing staff which consisted of demographic information and three parts of knowledge, attitude, and performance. Knowledge section had 20 questions, which measured information and knowledge of individuals about incidents and disasters and a perfect score was allocated to the right answer and the incorrect answer would receive a 0 score. Range of scores in this section is variable between 0 and 80. The attitude section also included 20 questions and its scoring was from very high (score 4) to very low (score 1) so that obtaining higher scores refers to a better attitude. Range of scores was from 20 to 80. Questions of performance section were related to the status of hospital staff performance in response to disasters, which contained 25 two-choice questions with Yes (4 score) and No (0 score) with scores ranging from 0 to 100.

The researcher-made questionnaire was used in master thesis of Borhan Nezhad, which its reliability was confirmed by the Cronbach  $\alpha$  coefficient of 0.87 and Pearson correlation coefficient of 0.86 [14]. All in all, obtaining a

high score in this questionnaire indicates having appropriate knowledge, attitude, and performance in dealing with disasters and crisis. Total score of this questionnaire is variable between 20 and 260. To check the validity of the questionnaire, we used content validity. For this purpose, although the contents of the questionnaire were valid and reliable in several studies, 10 professors and students in PhD course of health care in disasters reviewed the questionnaire and their views were observed after confirmation by the supervisor professor. To test reliability of nurses' preparedness questionnaire, we estimated its internal consistency. Results showed that the Cronbach  $\alpha$  for three areas of knowledge, attitude and performance were 0.71, 0.82, and 0.92, respectively.

The participants completed the questionnaires once before the training workshop as the pretest and then a month after the intervention as the posttest. The participants were assured of the information confidentiality and the questionnaires were distributed among them without mentioning name and specifications. To analyze the data, SPSS 18 was used. Kolmogorov-Smirnov test was used to test normal distribution of data variables. In order to analyze the obtained data, descriptive statistics (mean, standard deviation and percentage) were used. To study the mean obtained data variables before and after training of nurses, paired t test was used. Also, to compare quantitative scores in the intervention and control groups, independent t test was used.

### 3. Results

Subjects of study included 50 nursing directors of Madaen and Dey hospitals, all of them had management experience. Subjects of Madaen Hospital were enrolled in the intervention group and subjects of Dey Hospital in the control group. Table 1 presents their characteristics.

Table 2 presented that no significant differences were observed between groups before the intervention with regard to the average scores of knowledge ( $P = 0.55$ ), attitudes ( $P = 0.633$ ) and performance ( $P = 0.836$ ), but after the intervention scores significantly changed, i.e., scores for knowledge ( $P = 0.007$ ), attitude ( $P = 0.0001$ ), and performance ( $P = 0.0001$ ) of the intervention group were significantly higher than those for the control group. The results also showed that after the intervention, the mean scores of knowledge ( $P = 0.009$ ), attitude ( $P = 0.0001$ ), and performance ( $P = 0.0001$ ) for the intervention group in posttest was significantly increased compared to their pretest results, while average scores of knowledge ( $P = 0.170$ ), attitude ( $P = 0.200$ ), and performance ( $P = 0.341$ ) in the control group showed no significant difference in pretest and posttest. Overall, results of this study suggest promising effect of training on the readiness of nurses in the face of incidents and disasters.

### 4. Discussion

The findings of this study indicate the effects of training on preparedness (knowledge, attitude, and performance)

Table 1. The demographics of study groups

Variable	Intervention Group		Control Group		P	
	No.	%	No.	%		
Education	Bachelor degree	24	88.9	20	87	0.585
	Master's degree	3	11.1	3	13	
Work experience, y	≤ 15	10	37	11	47.8	0.315
	> 15	17	63	12	52.2	
Experience of relief aid	Yes	4	14.8	0	0	0.076
	No	23	85.2	23	100	
Attendance in risk management class	Yes	11	40.7	4	17.4	0.067
	No	16	59.3	19	82.6	
Membership in crisis committee	Yes	6	22.2	3	13	0.321
	No	21	77.8	20	87	

**Table 2.** Comparing average pretest and posttest readiness scores of nurses in the intervention and control groups

Variable	Group	Pretest		Posttest		P for the Independent T-test
		Mean	SD	Mean	SD	
Knowledge	Intervention	37.7	9.9	45.4	8.8	0.009
	Control	36.3	6.2	38.6	8.1	0.170
P for the Independent T-test		0.55		0.007		
Attitude	Intervention	58.2	4.8	2.5	74.6	0.0001
	Control	57.6	4.7	8.5	60	0.200
P for the Independent T-test		0.633		0.0001		
Performance	Intervention	45.1	2.7	81.1	5.1	0.0001
	Control	46.9	3.2	3.3	53.2	0.341
P for the Independent T-test		0.839		0.0001		

of nurses. Education and training are recommended methods to improve the preparedness of nurses and other health workers to cope with incidents and disasters. Studies have shown that most nurses are not even aware of a risk management protocol at their workplace [15]. Study results also showed that about two-thirds of nurses in Jordan were not prepared to deal with incidents and disasters [16]. The findings of Buck et al. (2013) study also showed that most nurses in Texas hospitals have not enough confidence to deal with and respond to incidents and disasters [17]. Vahedparast et al. study also showed that none of the hospitals in Bushehr had training guidelines for crisis preparedness [18].

Ghanbari et al. (2009) in a study evaluated the effect of disaster preparedness program in Razi Hospital of Tehran on preparedness of nurses which was similar to the current study results. Their findings showed that mean score of knowledge, attitude, and performance of nurses after the intervention significantly increased which was consistent with the present study [19]. Borhan Nezhad (2010) also in an interventional study investigated the effect of implementing hospital incident command system on preparedness of Incidents and Disasters Committee on Zarand nursing staff. The results of their study showed that average readiness scores of nurses enhanced significantly after the intervention [14]. The results Qureshi et al. study (2004) on the nurses in selected hospitals in New York also showed that training significantly increased knowledge and attitude of nurses in response to incidents and disasters [20].

Other studies have been conducted with different interventions on nurses like displaying hospital maneuver films [21] and training in the form of classroom and simulated exercises which supported the desirable effect of training on enhancement of group therapy preparedness. Implementation of educational programs on reducing mortality of the injured during disasters has been effective, because it leads to promotion of staff awareness about existing programs to cope with the incidents and disasters, increasing their participation in planning and solving existing problems, and improving staff skills in carrying out their assigned tasks [19].

### 5. Conclusion

Given the importance of training in promoting the preparedness of nurses to deal with incidents and disasters, execution of these training courses in different forms such as workshops, conferences, and displaying movies seems necessary.

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### Conflict of Interest

The authors declared no conflict of interests.

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