

## Research Paper

# Effects of Empowerment Programs on Nurses' Competence in Disaster Response



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## ABSTRACT

**Background:** It is necessary to prepare nurses for their important and accountable roles in disaster response teams. Given the lack of in-service training courses, nurses' knowledge and skills in responding to disasters are lower than the desired level. This status can lead to nurses' poor performance in caring for victims of disasters. This study aims to determine the effects of empowerment programs on nurses' competence in disaster response.

**Materials and Methods:** A total of 70 nurses working in Ardal and Naghan hospitals in Chaharmahal and Bakhtiari Province, Iran, in 2020 were selected via a sampling method. One hospital was randomly selected as the intervention and the other as the control. The members of the intervention group were divided into 5 groups. Educational sessions were held in four 2-h sessions in one month. In addition, the intervention consisted of a 2-day workshop, hanging posters, and pamphlets that covered topics of competencies in disaster nursing.

**Results:** The results showed that the mean score of nurses' competence score significantly increased in the intervention group ( $P=0.001$ ); however, no significant difference was observed in the control group ( $P>0.05$ ). Additionally, significant improvements were observed in all dimensions of competencies in the experimental group. The Mean $\pm$ SD scores of the increase in different domains of nurses' competencies were as follows: management, 16 $\pm$ 4.6; ethical competency, 12 $\pm$ 2.8; personal competency, 18 $\pm$ 8.6; and technical competency, 30 $\pm$ 9.3.

**Conclusion:** According to other study results with the same scale in Iran, nurses' competencies in disaster response are not desirable; therefore, it is recommended that nurses, administrators, and other members of the healthcare system use these results to improve nurses' competencies through in-service training.

### Keywords:

Empowerment, Professional competence, Nurse, Disasters

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## 1. Introduction

The World Health Organization (WHO) defines a disaster as a serious disruption in the functioning of a community or a society that causes widespread human, material, economic, or environmental losses that exceed the ability of the affected community or society to cope through its resources [1]. In recent years, the number and intensity of disasters have dramatically increased worldwide [2, 3]. According to the statistics provided by the Center of Research on the Epidemiology of Disaster (CREED), floods were the deadliest type of disaster worldwide in 2019 [4]. In 2022, a total of 396 disastrous events occurred that affected 95 million people and caused a \$103 billion loss worldwide [5]. Iran is one of the most susceptible countries in the world to such events and disasters. Earthquakes, droughts, and floods are among the most common disasters in Iran [6]. Disasters disrupt the customary delivery of healthcare to the community, and one of the important goals of nurses in these circumstances is to provide the best possible level of health for individuals [7]. They must work within narrow time constraints and combine the caring aspect of their role with highly developed technical skills and extensive specialist knowledge in a disastrous situation [8].

One task for disaster preparedness is to develop well-educated nurses to engage in relief operations; therefore, effective preparation of nurses and competency-based education is crucial [9]. Assessing nurses' competence is vital in identifying areas of professional development and educational needs, and also in ensuring that nurses' competencies are best employed in disaster relief [10]. One of the recommended strategies to increase competency in the response phase is to use staff empowerment programs, which are usually done in the form of continuing education [11]. Empowerment means starting work in a process that allows people to discover novel competencies and find a new way to apply these competencies in all stages of their lives. Through this process, people gradually take control of their affairs [12].

In Iran, disaster nursing is poorly defined and educational opportunities are scarce. According to research, most nurses in Iran have not passed any training to manage events and disasters and usually gain experience because of participating in previous events and disasters. And if this population has received some education, the training had not been adequate [13]. Nurses for disaster response need education and training founded in the disaster nurse competencies framework that has been developed and edited by WHO. This framework should

be observed as a guide in the education and practice of disaster nurses to ensure the effective delivery of healthcare during and after a disastrous event. The International Council of Nursing (ICN) framework allows disaster nurses to learn basic disaster context. It is structured using 4 domains: mitigation/prevention competencies, preparedness competencies, response competencies, and recovery/rehabilitation competencies [14]. Regarding the importance of the nursing role in disaster response, these phases of preparedness have been considered a priority in empowerment programs. Accordingly, in terms of the importance of in-service training for the preparedness of nurses for disaster, this study aims to evaluate the effects of empowerment training on improving the preparedness of nurses for disaster response.

## 2. Materials and Methods

This was a quasi-experimental study with a pretest-posttest design and a control group. The study population included all nurses working in Naghan and Ardal hospitals in Chaharmahal and Bakhtiari Province, Iran. The sample size was obtained at 34 for each group based on the study by Aliakbari et al., as well as the sample size formula, considering the probability of the type I error at 0.05 and the test power of 0.90. To deal with the possible loss (10%), 35 people in each group and a total of 70 people were included in the study [15]. The samples were selected according to the inclusion criteria that comprised the willingness to participate in the study and providing informed consent, having at least a bachelor's degree in nursing, not participating in incident management education programs in the last 6 months, and having at least one year of work experience. The exclusion criteria were leaving the study or being absent for more than one session from the training program. We used the convenience sampling method, and after selecting 70 nurses, they were allocated into 2 groups by using the block randomization method.

To ensure that disaster nurses possess adequate knowledge, skills, and abilities to respond in a disaster, these nurses need education and training founded in disaster nurse competencies, possibly those provided by the ICN framework. Accordingly, the ICN framework of disaster nurse competencies, in the response phase, was considered as a guide in the development of the empowerment program in the current study (Table 1). The intervention consisted of 4 workshops, hanging posters, and pamphlets that covered various topics, such as disaster terminology, adapting documentation, and knowing how to fit into the disaster plan, for example, the chain of command, rapid assessment, and triage. The

**Table 1.** Contents of training sessions for confronting events and disasters

Sessions	Topics	Contents
1	Care of communities	Prioritize care, Immunization, Meeting basic needs, Resource evaluation (shelter, food, healthcare).
2	Care of individuals and families	Prompt assessment of the disaster situation and appropriate emergency intervention, Care based on triage, Creating a safe environment, Patient transfer, Prescribing medicine and vaccination, Prevention of infection, Maintaining personal security, Caring for the deceased according to cultural beliefs,
3	Psychological care	Referring survivors to other organizations, if necessary,
4	Care of vulnerable population	Supporting and ensuring the survivors' access to services.

education was provided through the lecture method and using props by the research team. After the educational session, the research team along with the members of the emergency medical services team of the hospital provided education for familiarity with tools and equipment in the ambulance and how to work with them. In addition, nurses in the intervention group learned about basic and advanced first aid, how to isolate persons at risk of spreading communicable diseases, and implement or participate in decontamination [16].

The study data were collected using two questionnaires. The first questionnaire obtained the subjects' demographic characteristics, including age, gender, marital status, educational level, job status, work experience, ward, and work shift. The second questionnaire was used to assess nurses' competencies. The questionnaire consisted of 5 subscales for providing care in disastrous events. The questionnaire was designed by Aliakbari et al., in 2015. The internal consistency via the Cronbach  $\alpha$  coefficient has been reported to be higher than 0.88 for all subscales of the questionnaire and 0.96 for the whole scale [17]. The correlation coefficient between the two assessments in all subscales of the questionnaire was higher than 0.94 [18]. Questionnaires were completed

immediately and 3 months post-intervention. To assess the sustainability of any derived beneficial effects, a 3-month post-intervention assessment is relatively standard in empowerment intervention trials [19].

The data were shown as Mean $\pm$ SD for continuous variables and frequency with percentage for categorical variables. The Chi-square test was used to compare categorical variables between groups and the independent t test for the continuous ones. The normality distribution was assessed via the Kolmogorov–Smirnov test. The parametric repeated measures analysis of variance was applied to test whether any change exists among variables during the study between the groups. Statistical analysis was done by the SPSS software, version 23.  $P < 0.05$  were considered statistically significant.

### Ethical considerations

This study was approved by the Ethics Committee of [Shahrekord University of Medical Sciences](#) (Code: IR.SKUMS.REC.1399.059). At first, the hospital officials were briefed about the subject of the study, its objectives, and methods of training. In addition, the research objectives were described for nurses, and if they

were interested to participate in the study, their written informed consent was obtained. The nurses were assured that all the collected data remains confidential and they can complete the questionnaires anonymously. After the intervention, the educational content presented for the intervention group was also provided to the control group.

### 3. Results

The results of the demographic characteristics of the sample showed that in the control group ( $n=35$ ), 13 (37.1%) were men and 22 (62.1%) were women. In the intervention group ( $n=35$ ), 3 were men (8.6%) and 32 (91.4%) were women. The age range of nurses was 24 to 47 years. In the control group, the Mean $\pm$ SD age was  $34\pm 6.37$  years, and in the intervention group,  $33.45\pm 6.22$  years. Other demographic characteristics of nurses in the two groups are provided in Table 2. The demographic characteristics were not significantly different between the two groups ( $P>0.05$ ).

The results showed that nurse's Mean $\pm$ SD professional competencies in the control and the intervention group were  $132.57\pm 24.64$  and  $121.97\pm 19.95$ , respectively. At the beginning of the intervention, no statistically significant difference between the two groups ( $P=0.052$ ) was observed in terms of general nursing competencies. Then, immediately and 3 months after the intervention, the Mean $\pm$ SD scores were  $187.11\pm 19.57$  and  $187.25\pm 19.72$ , respectively which were significantly higher than those in the control group ( $P<0.001$ ). Although sex distribution was significantly different between the two groups, in the presence of the group variable in the repeated measures analysis of the variance model, gender had no effect on the dependent variables during the study.

### 4. Discussion

This study aimed to determine the effects of empowerment programs on the competencies of nurses in response to disasters. Regarding the demographic variables, the Mean $\pm$ SD age and work experience of nurses in this study were  $33.45\pm 6.22$  years and  $11.7\pm 4.23$  years, respectively. The results of similar studies in this field indicate that the

**Table 2.** Demographic characteristics of the sample

Variables	No. (%) / Mean $\pm$ SD				P	
	Control		Intervention			
Age (y)	33.45 $\pm$ 6.22		34 $\pm$ 6.37		0.72	
Sex	Male	13	37.1	3	8.6	0.004
	Female	22	62.9	32	91.4	
Marital status	Single	12	34.3	10	28.6	0.61
	Married	23	65.7	25	71.4	
Education level	Bachelor	34	97.1	35	100	0.32
	Master	1	2.9	0	0	
Work area	Emergency	19	54.3	17	48.6	0.65
	Internal medicine	16	45.7	18	51.4	
Participation in disaster education	Yes	17	48.6	17	48.6	0.1
	No	18	51.4	18	51.4	
History of participating in the exercise and drills in recent six month	Yes	12	43.3	10	28.6	0.61
	No	23	56.7	25	71.4	
History of participating in disaster	Yes	4	11.4	6	17.1	0.50
	No	31	88.6	29	82.9	

**Table 3.** Comparing the competence of nurses in two groups

Variables	Stages	Mean±SD		P
		Control	Intervention	
Nurse Competency	Before the intervention	132.57±24.64	121.97±19.95	0.052
	Immediately after the intervention	128.31±21.32	187.11±19.57	<0.001
	Three months after the intervention	128.31±21.35	187.25±19.72	<0.001
P (Within Groups)		<0.01	<0.001	<0.001*

\* Based on the interaction time of the group.

age range was similar to other studies, which indicates that the young age of the nursing community and the need for more specialized training increase the experience and ability of this group to provide specialized care in disasters [20]. The results of the independent t test showed that the mean scores of disaster response competencies were not significantly different in males and females in both groups. In the study by Aliakbari et al., the mean scores of disaster response competencies were significantly higher in male nurses compared to their female peers [15].

In addition, 48.4% of the control group had a history of participating in training courses, 34.3% had a history of participating in training maneuvers, and 11.4% had a history of participating in disasters. In the intervention group, 48.6% had a history of participating in training courses, 28% had a history of participating in training maneuvers, and 17.1% had a history of participating in disasters. However, in studies conducted in other countries, the participation rate of the participants in a disaster-related training course was more than 50% [21].

The present study's findings showed that the professional competency score in the intervention group was significantly higher than in the control group. In this regard, Inkaew and Chompunud conducted a study to investigate the effect of the interactive educational method on the competencies of nursing students in disasters. Training on disaster management, nursing disaster, first aid, triage, and nursing care was provided to the intervention group. The results revealed that the changes in the intervention group were significant [22]. Also, Huh and Kang conducted a study and concluded that disaster educational programs were effective in increasing disaster nursing competencies among nursing students and recommend that this is a useful intervention strategy for nursing students [23]. In an article conducted by Ameriun et al. in Tehran City, Iran, entitled "Study of the Effect of Training Program and Trauma Maneuver on the Readiness of Staff in a Selected Mili-

tary Hospital," the results showed that the readiness of the participants was not increased to an acceptable level [24]. Some studies in this field have shown the effectiveness of periodic maneuvers and education in improving the overall competencies of nurses. Among them, Nezhadshafiee et al. conducted a study entitled "Professional Competence of Nurses in Disasters," in Kerman City, Iran, in 2017 (Table 3). Their results showed that the participation of nurses in maneuvers has the greatest impact on the professional competencies of nurses in disasters, which is consistent with the results of the present study [25].

Given the related factors to the level of competency of the participants, the results showed that disaster-related training and maneuver training had a positive relationship with nurses' competencies. However, in the study by Aliakbari et al., 54% of nurses had a history of disaster attendance and 62.80% had a history of maneuver participation [26]. In addition, in the study by Luo et al., a significant relationship was reported between disaster education and disaster experience and nurses' competencies score in response to disasters [27]. Also, according to the results of the study by Fung et al., among Hong Kong nurses, disaster maneuvers are important and useful tools for disaster response competence [28]. It can be concluded that despite the importance of training courses and maneuvers in the preparedness of nurses for disaster response, this issue has not been addressed sufficiently. Therefore, this study emphasizes the need for education in disaster competence, especially in nursing education.

As one of the limitations of this study, the required data was gathered via self-report data collection; therefore, it is necessary to conduct more comprehensive studies that evaluate nurses with more objective methods, such as objective structured clinical examination. Another limitation of the present study is that the results were obtained in a specific setting, which necessitates conducting similar studies in other settings, countries, and so on.

## 5. Conclusion

In Iran, few nurses have received any formal education in the areas of emergency preparedness or disaster response; therefore, they have wide gaps in their knowledge and skills in disaster care. Studies in this field have highlighted the need for continuous training, as well as research in this area. Disaster education for nurses needs to be improved and become a priority. This article shows the positive effect of empowerment programs on disaster nurse competence both in knowledge and skills related to disaster nursing and identifies disaster nursing training priorities in Iran. The research also contributes to our understanding of the knowledge, attributes, and skills that are required for nursing in disaster response. Future research should try to scientifically evaluate the impact of educational programs.

## Ethical Considerations

### Compliance with ethical guidelines

All ethical principles are considered in this article. The participants were informed about the purpose and the implementation stages of the research. The participants were also assured about the confidentiality of their information and were free to leave the study whenever they wished, and if desired, the research results would be available to them. The present study was approved by the Ethics Committee of [Shahrekord University of Medical Sciences](#) (Code: IR.IUMS.REC.1399.059).

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### Authors' contributions

All authors equally contributed to preparing this article.

### Conflict of interest

The authors declare no conflict of interest.

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