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The Effect of Disaster Management Training Program on Knowledge, Attitude, and Practice of Hospital Staffs in Natural Disasters

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ABSTRACT

Introduction: Hospitals have a very important role in responding to disasters. Since nurses are one of the largest group of the health team and play multi-roles in patient treatment, improvement of their knowledge and skills helps them to act better in disasters.The purpose of this study was to investigate the effect of a disaster management training program on the level of knowledge, attitude, and practice of nursing staffs.

Methods: The present interventional study was conducted in Shahid Rahnemoon Hospital, Yazd, Iran in 2018. At first, 40 nurses were randomly selected and their level of knowledge, attitude, and practice was measured using the questionnaire of nurses' preparedness in disasters. The questionnaire consisted of 72 items; The total attainable score was 132 in the questionnaire. Then, the disaster preparedness training program was implemented. The program was conducted in the form of a one-day workshop for eight hours. One month after the education program, the nurses' level of readiness, including their knowledge, attitude, and practice was re-evaluated using the same questionnaire. Data analysis was conducted by paired samples t-test using SPSS 22.

Results: The results of the study showed that the mean score of nurses' knowledge increased from 14.23 to 21.30, the mean scores of their attitude increased from 62.20 to 71.67, and their performance mean score increased from 7.28 to 11.88. These differences were statistically significant ($p < 0.001$). Furthermore, the total mean score of nurses' readiness increased from 82.28 to 104.53, which was statistically significant ($p < 0.001$).

Conclusion: According to the results of the study, the educational program increased the nurses' preparedness containing their knowledge, attitude, and practice in responding to disasters. Consequently, continuous education courses on crisis and disaster management are necessary. The nurses are also recommended to participate in these courses to increase their readiness.

Keywords: Disasters, Preparedness, Crisis management, Nurses

Introduction

Hundreds of hospitals and health facilities have been destroyed or lost their effectiveness annually around the world as a result of natural disasters. These facilities are among the major

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investments in each country and their destruction has many adverse economic consequences. In addition to the economic dimensions, destruction or inactivity of hospitals can lead to a sense of social insecurity and instability as the lack of alternative facilities. It is noteworthy that the hospitals do not only disrupt only in physical damages, but also mild or moderate hazards can disrupt their functions (1). In accidents and disasters, hospitals and health centers are among the first units that can reduce the mortality and disability rate, increase the number of survivors, relieve physical and psychological illness, and play a crucial role in managing and controlling the crisis (2, 3). However, during the crisis the structure, facilities, and organization of hospitals may be damaged, which can cause economic and qualitative effects on health services (4, 5).

Today, most organizations are prepared to deal with incidents; hospitals must also be able to deal with any possible crisis and emergency. So, well-informed personnel, effective performance management, as well as punctual plans are required to deal with unexpected and emergency situations. Considering the increasing number of disasters, their consequences, and the role of health services before, during, and after such incidents, the readiness of health services' staffs is very important (6). Nurses, are the largest (7, 8) and often the first health care providers (9). The professional readiness of nurses to carry out their duties in such situations is very important (10, 11). Different studies (14-14) indicated that nurses were not adequately trained and prepared in such conditions. Considering the increasing number of disasters and their consequences as well as the role of health services before, during, and after such incidents, the readiness of staffs of health services is critical (16, 15). Therefore, it is necessary to have active crisis management in all hospitals and health centers. We also need to be well-prepared to deal with the probable crisis situations.

In the study of Farajzadeh (2017) on nurses' preparedness for accidents and disasters, the level of knowledge in nurses was evaluated at weak level, their performance was assessed at average level, and their attitudes was reported to be good (17, 18). Ganbari et al. investigated the level of knowledge and performance of nurses before the training program and reported that it was low (19). Bartly et al. also mentioned that the training courses were necessary to educate the health care staffs. They concluded that these training courses should be implemented and evaluated constantly (20). In order to reduce the damages caused by disasters, the healthcare organizations should always address the training programs to prepare the personnel (19).

Previous studies (21, 22) in other countries indicated the importance of preparedness of nurses and other health care staffs in response to disasters. Studies conducted in Iran also reported the lack of appropriate programs in this regard and reported that the health care providers, especially nurses were not ready enough to respond to the disasters (19, 23).

Among the teaching methods, lectures are one of the most effective ways in the educational system. Shirley et al. indicated that effective education was achieved when there was audio communication between the educator and learners; this target is well suited in the lecture method (24). According to a study by Mokhtari Nouri et al. (25) different teaching methods have no precedence over each other and the effectiveness of learning methods, especially lectures differs in learning different contents. Therefore, the impact of lecture on the level of learning can be considered in specific subjects.

Considering the occurrence of disasters in different parts of Iran, crisis management in reducing the damage and its consequences, identification of its infrastructure, and assessment of the ability of all treatment centers are necessary to appropriately plan the deal with disasters. Regarding lack of research on the effect of training on the disaster preparedness in nurses and hospital staffs, this study was conducted to investigate the effect of disaster education program on the knowledge,

attitude, and practice of nurses for responding to natural disasters at Shahid Rahnemon Hospital of Yazd in 2018.

Materials and Methods

The present study was conducted with a pre-test post-test design on a group of staffs working at Shahid Rahnemoon Hospital in Yazd. In this study, the research community included the hospital staffs with a bachelor or master's degree in nursing or a diploma in health care, who did not attend similar educational courses and agreed to attend the educational training. Samples were randomly selected using a random number table. Participants who did not attend the workshop or did not complete the questionnaire were excluded from the study.

Participants were ensured about the confidentiality of information and about the right to withdraw freely from the study. After receiving the consent forms, the questionnaire was distributed among the applicants. This study was part of a research project at the Clinical Development Center of Shahid Ranmon Hospital and the Ethics Code for the study was IR.SSU.REC.1396.193.

The sample size in this study was calculated to be 40 based on a study by Ganbari et al. (19) with considering 10 percent attrition. In this regard, two sided significance level of $\alpha = 0.05$, the test power of 80 percent, and the standard deviation of 5 (SD = 5) were considered. The disaster preparedness training program was conducted by researchers in a one-day lecture workshop in eight hours.

The outline of training program included: 1) special concepts of disaster and the effects of disaster on health, 2) disaster management and its stages, 3) assessment of possible hazards and vulnerabilities, and 4) stages of planning in disasters. It should be noted that the content of training program was confirmed by the continuing education office of the ministry of health. At the end of the lecture, different scenarios of incidents in hospital, such as power outages and fire in the hospital as well as hospital actions were discussed based on the learning contents. The aim of this part was to review the lessons learned in more details. In order to assess the readiness of the staffs, a disaster preparedness questionnaire was used, which validity and reliability was confirmed in a previous study. Reliability and validity of the questioner were 0.878 and 0.867, respectively (19). The questionnaire included 27 questions to assess knowledge with a minimum score of zero and maximum of 27. Furthermore, 20 questions were designed to assess attitude toward crisis management and disaster management planning with the minimum and maximum attainable scores of 20 and 80. The performance of nurses in disaster recovery planning was assessed in 25 questions with the minimum and maximum attainable scores of zero and 25. The total score of the questionnaire, which showed the readiness level was 132. The disaster preparedness questionnaire was completed by participants in the lecture training program once a week before and then one month after the workshop.

Statistical analysis

The collected data were analyzed using the SPSS version 22. Since the results of the Kolmogorov-Smirnov test showed the natural distribution of the data, the paired t–test was used to analyze the information. The significance level was considered at $p < 0.05$.

Results

This study was conducted on 40 hospital staffs at Shahid Rahnemoun Hospital, who had no history of participating in crisis management courses. The demographic data and work experience of the participants are provided in **Table 1**.

Table 1: Frequency distribution of demographic variables of participants

Variable		Frequency	Percentage
Gender	Female	25	37.5
	Male	15	62.5
Education	Bachelor's degree	34	85
	Master's degree	3	7.5
	Diploma in health care services	3	7.5
Management experience	Yes	4	10
	No	36	90
Disaster relief history	Yes	1	2.5
	No	39	97.5
Disaster Education History	Yes	3	7.5
	No	37	92.5
Member of the crisis committee	Yes	3	7.5
	No	37	92.5

According to the comparative results of the average total scores and the scores of three components of disaster preparedness using paired t-test (**Table 2**), a significant difference was observed among the mean scores of knowledge, attitude, and practice between pre-test and post-test (one month after the education). The average score of nurses' knowledge increased from 14.23 to 21.30, the attitude score increased from 62.20 to 71.67, and the performance score increased from 7.28 to 11.88. These differences were statistically significant (p <0/001). In general, the average score of readiness increased from 82.28 to 104.53, which was also statistically significant (p <0.001).

Table 2: Comparison of mean scores in different areas of the nurses' preparedness questionnaire before and after the test

		Mean	Standard deviation	standard error	P_value
Knowledge	pre-TEST	14.23	3.198	0.506	<0.001
	Post-test	21.30	2.954	0.467	
Attitude	pre-TEST	62.20	6.509	1.029	<0.001
	Post-test	71.60	6.180	0.977	
Practice	pre-TEST	7.28	3.665	0.580	<0.001
	Post-test	11.88	4.614	0.830	
Total score	pre-TEST	82.28	8.286	1.310	<0.001
	Post-test	104.53	9.438	1.492	

Paired t-test, significant level p <0/05

Table 3 shows the difference in participants' mean scores of knowledge, attitude, performance, and total readiness before and after the test. The results of the study showed that the post-test mean score of readiness increased and the difference was statistically significant (p <0.001).

Table 3: The mean change values for the subscales and the total preparedness score

	Mean	SD	Average standard error	95% confidence interval difference, paired t test				
				Minimum	Maximum	t	Df	P-value
Knowledge score	7.075	1.760	0.278	7.638	6.512	25.427	39	<0.001
Attitude score	9.400	5.995	0.948	11.317	7.483	9.917	39	<0.001
Practice score before and after the test	4.600	3.485	0.551	5.714	3.486	8.349	39	<0.001
Total score	22.250	6.857	1.084	24.443	20.057	20.524	39	<0.001

Discussion

The findings of this study showed the positive effect of education on knowledge, attitude, and practice of nurses. Changes in knowledge and attitude levels will lead to change in performance. The impact of education through lecture on different domains was also mentioned in other studies (25-27), which is consistent with the results of the present study. However, the results of this study are not consistent with the study done by Evans Baqaa et al. (28) on the effect of lecture-based education on knowledge, attitude, and practice of high school girls about iron deficiency anemia in Khalkhal. The results before the intervention were at a low level, which confirms the need for training in this field. In general, lectures could promote all areas of learning.

Previous studies indicated the positive effects of educational programs on nurses' readiness to respond to potential disasters (19, 21). Despite the importance of training in improving the level of knowledge and ability of employees in crisis, the education structure of hospitals with regard to disaster management is still unclear. Published posters and educational brochures about disasters does not seem to be adequate. There are no guidelines for preparing hospitals during crisis and disasters, which are also mentioned in the study of Daneshmand et al. (29).

According to a study by Zabuli only 9.5 percent of hospitals had a regular education plan and 28.6 percent of these hospitals had good educational facilities. Differences in the viewpoint of managers on education had an impact on the degree of readiness and education in hospitals (30). The results of several studies showed that a large proportion of nurses were not adequately trained in disaster preparedness and that they were not prepared to respond to possible disasters (14, 19, 31). According to a study by Duong et al. (2009) (31) in Australia and a study by Katz et al. (2006) (32) in Hawaii, nurses did not have enough skills to manage crises because of lack of proper education. In addition, the study by Langan and James (2005) showed that physicians and nurses had insufficient information about unexpected events and disasters (17).

Findings of Ganbari et al. showed that the implementation of educational programs reduced the mortality rate of the injured people during disasters. These programs improve personnel awareness of existing plans to deal with the disasters, increase the participation of the staff in planning, eliminate the problems, and also increase the skills of the personnel in carrying out the tasks (19).

The integration of organizational units for human resource training, the formation of the relationship between nursing staff and disaster response organizations, the creative content of education, and effective economic systems for nursing education will provide preparedness for natural disasters and disaster response (33). In the present study, scores in all three areas of knowledge, attitude, and practice increased, but the increase in performance score was less than

those of attitude and knowledge and the difference was statistically significant. Similarly, participants achieved a high score in the attitude subscale. The increase in attitude did not lead to a much change in the performance of nurses, although the change in performance was statistically significant. We also found that the staffs did not take measures to improve their performance, for example they did not consider identifying the risks in the department, planning to reduce these risks, and participating in hospital crisis activities in order to prepare for the response to the disaster. This could be due to the lack of knowledge and other factors such as low motivation, disadvantages in the work environment, lack of certain facilities, and inadequate incentives.

According to the studies by Wang et al. (21), Bartley et al. (34) and Idrose et al. (35) on the disaster preparedness training, the educational programs were effective on improving the readiness of medical personnel in dealing with disasters (15).

Motivation, equipment, facilities for maneuvering, work space, and environmental conditions are factors that increase the level of nursing readiness. As a result, continuing education for disaster preparedness, appropriate educational environment, and appropriate incentives are ways to increase nurses' preparedness. Due to nurses' medical duties and shortage of nursing staff, they are faced with difficulties to attend the educational program, so other educational methods should be considered.

There are a number of limitations that should be considered when interpreting the current study results. The training program was designed as an eight-hour course, which was a very limited time to train staffs comprehensively and evaluate their preparedness for disasters. Other limitations of this study were lack of a control group, the possibility of evaluating the short-term effects of education on knowledge and skills, and lack of evaluating the impact of training course in long term.

Conclusion

Training is an effective way of preparing the personnel for proper disaster response and reducing the undesirable effects of disasters. It also increases the knowledge of personnel forplanning and determining their tasks in plans. Moreover, since nursing personnel have a very important role in coordinating and helping the injured people at disasters, related training and planning are recommended to prepare them for giving appropriate responses to such situations.

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Conflict of interest

The authors of this study announce no conflict of interest.

Authors' contribution

SM and AN; the concept, design, data analysis, and manuscript preparation. AE , SK AND MS manuscript editing, and manuscript review.

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