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Corresponding author:
Fatemeh Aliakbari,
Email: aliakbarifa@gmail.com.

Nursing Students' Competency to Attend Disaster Situations: A Study in Western Iran

Fatemeh Kaviani[1], Fatemeh Aliakbari[2], Hojjat Sheikhbardsiri[3] and Paul Arbon[4]

[1]Student Research Committee, Shahrekord University of Medical Sciences, Shahrekord, Iran; [2]Community-Oriented Nursing Midwifery Research Center, Shahrekord University of Medical Sciences, Shahrekord, Iran; [3]Health in Disasters and Emergencies Research Center, Institute for Future Studies in Health, Kerman University of Medical Sciences, Kerman, Iran and [4]Torrens Resilience Institute, Flinders University, Adelaide, Australia

Abstract

Objective: The disaster preparedness of nurses is important as nurses are members of a health care team that needs to work systematically and collaboratively in all conditions. Although education and training naturally underpin effective practice, disaster nursing education is rarely provided to nurses in Iran. Because disaster situations, by definition, overwhelm health services, it is likely that nursing students will be required to join their colleagues in the response. The purpose of this study was to evaluate the competency of nursing students to attend disaster situations.

Methods: This descriptive, analytical study was conducted in western Iran in 2020. A total of 70 nursing students in the fourth (final) year of their undergraduate nursing education entered the study by a census sampling method. Data collection was undertaken using a validated disaster competency assessment questionnaire. The data were analyzed using SPSS version 21 (IBM Corp, Armonk, NY) with descriptive and analytic tests.

Results: The mean age of participants was 21.4 ± 2.14 and 57.1% of them were women; 45 participants (64.3%) had received no disaster-related training, and 88.6% had no history of participating in disaster exercises. The total score for nursing students' competence was 125.58 ± 14.19. There was a significant relationship between the mean score of nursing competence in response to disasters and student history of participating in an exercise and training course ($P < 0.001$).

Conclusion: Students' competence in disaster situations is poor. Awareness of the competence condition of nurses is the first step to improve their preparedness as the most key members of the disaster health team. Conducting disaster-related training may be appropriate. The results of this study can provide evidence for the development of educational policies in disaster nursing education.

During recent years, the number and intensity of disasters have increased dramatically across the world.[1,2] According to statistics provided by the Center for Research on the Epidemiology of Disaster (CRED), worldwide floods were the deadliest type of disasters in 2020, followed by extreme temperature events, while storms affected the highest number of people. In this year, 396 disaster events occurred around the world that affected a total of 95 million people and caused US $103 billion in economic losses. Accounting for 40% of disaster events, Asia suffered the highest impact with 45% of overall deaths and 74% of the total number of people affected.[3] Iran is one of the 10 most disaster-prone countries in the world, and its vulnerability to earthquakes is 1000 times higher than that of the United States and 100 times higher than that of Japan.[4,5]

The United Nations Office for Disaster Risk Reduction (UNDRR) defines disaster as "a serious disruption to the functioning of a community or society, including widespread impacts of human, material, economic or environmental damage.[6] Disasters can result in chaos, widespread mortality, and property losses with long-term devastating social, physical, psychological, environmental, and economic consequences that affect the health of a population.[7]

Nurses play a key role in providing clinical care, and they are an essential member of the health care team that responds to disaster events.[8] It is therefore important that nurses be adequately prepared during their education at university and have the necessary competencies to effectively respond to disasters.[9] Competence means a combination of the knowledge, skills, and behaviors required to perform a specific task.[10] According to studies about nurse competences in disaster, technical, managerial, moral, and personal skills are important for all nurses who provide care.[11] They also need to have additional skills in order to provide effective disaster care.[12] Education is one of the most important requirements in achieving a high level of personal and professional competence to provide nursing care in disaster situations.[13]

However, a large number of nurses have never undergone training of response. In Iran, like in many countries, when considering existing nursing curricula, it can be seen that only theoretical

teaching is given, with no practical training that enables nurses to develop skills necessary to provide care to victims. Evidently, such theoretical content is not sufficient to develop necessary disaster nursing competency.[14] The International Council of Nurses (ICN) has published the Disaster Nursing Competency Framework.[15] The purpose of the framework is to increase nurses' preparedness for disaster and the effectiveness of their response. Several studies have shown that most nurses and nursing students lack the competencies required for nursing in disaster situations.[16–18]

Nurses' inability to play their role effectively in providing care to those affected by disaster can lead to missed care and poor(er) health outcomes for victims.[19,20] Problems that impede medical response arise from the inadequate education and training of health care professionals, as well as skill inadequacy and lack of experience. In many countries, including Iran, disaster nursing education is rarely provided to students.[21]

Training and acquiring competency in disaster nursing are important parts of a student's preparation for disaster response.[16] This research identifies the areas of required professional development and the associated educational needs of students, and will help ensure that nursing students' competence is put to the best possible use in disaster relief.

In Iran, disaster nursing is poorly defined, required competencies have not been clearly stated, and educational opportunities for students and other nurses are scarce.[22] Iranian disaster reports and published papers have not identified any study that can be used for assessing nursing student competence. Final year nursing students represent an example of the preparedness (competencies) of nurses generally and represent the gaps in their education, so the aim of this study was to evaluate the disaster nursing competency of students in western Iran.

Methods and Materials

Design and Subjects

In this analytical, cross-sectional study, the statistical population consisted of all nursing students in Chaharmahal and Bakhtiari Provinces in Iran. A total of 70 nursing students entered the study by a total census sampling method. First, a list of all nursing students was prepared, and all nursing students who met the inclusion criteria (studying in 7th and 8th nursing semesters, and willing to participate in the study) entered the study. The exclusion criterion was failing to complete less than 10% of the questionnaire.

This research was approved by the Ethics Committee of Shahrekord University of Medical Sciences (research code IR.SKUMS.REC.1398.180).

After clarifying the study purposes and obtaining the written consent from nursing students, the nursing students were allowed adequate time to complete the competence assessment questionnaire. The researcher reminded them that their participation in the study would be voluntary and their information would be confidential.

Data Collection Tool

The study data were collected using the disaster nursing competence scale designed by Aliakbari in 2013.[23] This questionnaire has 2 parts. The first part investigates the demographic information and the second part consists of 50 questions with 4 subscales. These subscales were "management competency (12 questions)," "individual specific competency (6 questions), "technical competency (23 questions)" rated on a 5-point Likert scale from very high (5) to very low (1), and "ethical and legal competency (9 questions)" rated on a 4-point Likert scale from rarely (1) to always (4). The minimum and maximum attainable scores in all domains are 50 and 244, respectively; obtaining a higher-than-cutoff point indicates the optimality of nurses' disaster response competencies (the calculated cutoff for the whole tool was 95.91). This questionnaire is a valid and reliable tool. The validity of the tool has been investigated and approved by Aliakbari. The internal consistency by Cronbach's α coefficient has been reported to be higher than 0.88 for all subscales of the questionnaire and 0.96 for the whole scale.[23] The test-retest method was also used to assess the reliability of the questionnaire. For this purpose, the questionnaire was twice administered to 20 nurses (not included in the main study) with a 2-week interval. The correlation coefficient between the 2 administrations in all subscales of the questionnaire was higher than 0.9.

Data Analysis

Data were analyzed by SPSS version 21 (IBM Corp, Armonk, NY) using descriptive (including frequency, percentage, mean, and standard deviation) and analytical statistical tests (including independent t-test; and multiple linear regression was used to identify association between variables and nurses' competency). The P value of less than 0.05 was considered significant.

Results

The demographic characteristics of the sample showed that out of 70 participants, 38 (57.1%) were female and 64 (91.4%) were single. The mean age of participants was 21.4 ± 2.14. In terms of training, 64.3% didn't receive training from any disaster-related training course; in terms of exercise training experience, 88.6% didn't attend exercises; and 71.4% didn't have a history of disaster participation. According to Table 1, the results of an independent t-test showed that the mean scores of disaster response competencies were significantly higher in the male participants than the female participants ($P < 0.001$).

Also, there was a significant relation between the mean score of disaster competency and history of exercise attendance and participating in disaster situations. The mean score of competencies was significantly higher in the students with the disaster-related training than those without such training ($P < 0.001$).

The minimum and maximum scores for all domains and the mean and standard deviation of participants' disaster response competencies in different domains are shown in Table 2. Also, nursing students assess their competency lower than the questionnaire's cutoff point in all domains. The results of participant distribution in different domains according to the questionnaire's cutoff point are presented in Table 3.

Discussion

Iran is an exceptionally disaster-prone country, and it is important to maintain and improve nurses' disaster response competencies and prepare nurses for disaster situations. The present study aimed to assess the disaster nursing competency of final year nursing students in western Iran. The results of the study demonstrate a mean score lower than average for nurses' disaster response competence in all domains. In Hung et al.'s study, before intervention students knowledge and perceived ability were poor, and they don't have

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Table 1. Nurses' demographic characteristics and competency score

Total competency score Sub-variable	Mean ± SD	t	*P* value
Gender			
Male	127/30 ± 12/15	7/48	*P* >0.001
Female	118/24 ± 11/18		
History of participating in disaster situation			*P* > 0.001
Yes	135/60 ± 14/67	8.21	
No	122/14 ± 12/13		
History of disaster-related education			*P* > 0.001
Yes	141/00 ± 11/75	7.15	
No	124/04 ± 13/36		

Table 2. Descriptive indexes of nurses' student competence in disaster response in different domains

Maximum	Minimum	Mean ± SD	Nursing students' scope of competence in response to disasters
Management competence	30/30 ± 5/11	23	40
Individual specific competence	20/60 ± 3/83	14	27
Technical competence	54/30 ± 9/56	40	74
Ethical and legal competence	10/78 ± 3/23	8	13
Overall score	125/58 ± 14/19	106	156

Table 3. Distribution of participants according to questionnaire cutoff point in different domains

Cutoff Point	Management		Ethical and Legal		Individual Specific Competence		Technical Competence		Overall Score	
	≤ 25/07	>25/07	≤ 9/60	> 9/60	≤ 18/16	> 18/16	≤ 43/06	> 43/06	≤95/91	>95/91
Number	46	24	48	22	57	13	62	8	51	19
Percentage	65.71	34.28	68.57	31.42	81.42	18.57	88.57	11.42	72.85	27.14

willingness to respond to disasters.[18] Furthermore, nursing students participating in the study by Yan et al. found that there is a gap between their knowledge and their ability to participate in disaster situations.[24] However, in Kim et al.'s study, the average level of disaster competency of nursing students was 2.76 out of 5, which was reported as average, and the mean score of readiness among participants was 2.14 out of 14 points. Finally, the authors conclude that students are not well prepared for disaster. They also reported that the participation in the disaster experience and the disaster-related knowledge had the greatest impact on the nurses' disaster response competencies, which is consistent with our results.[25]

Also, Duong et al. (2009), in Australia, investigated the preparedness of 152 emergency nurses during disaster situations. The nurses believed that they lacked the level of information and preparedness to participate in disaster situations.[26] Technical and Individual specific competencies were the main domains in which nursing students had lower scores compared to other domains. Oztekin et al. concluded that nursing students play a supportive role rather than a triage or management role as nurses participate in disaster situations. So, as a result, universities should focus on programs that can enhance the role of triage and management nurses as participants in disaster situations.[21]

The results of this study are consistent with the results of Aliakbari et al., which showed that nursing competencies are inadequate. The authors used the same questionnaires in which the results showed that nurses are not competent in skills such as working with prehospital emergency equipment, triage skills, and providing mental and physical care in disaster situations.[27]

Schmidt et al., in a descriptive study, explore students' perceptions of personal and program preparedness for disasters. Their findings indicated that nursing students are generally not well prepared for disasters. Therefore, they suggested that nurse educators develop strategies to prepare their students for disasters, especially in technical skills.[28]

According to results of the current study, the ability to respond to disaster is related to training and previous disaster exercise. Ozpulat and Kabasakal, in a descriptive study titled, "Knowledge Levels of Nursing Students on Disaster Nursing and Their State of Disaster Preparedness," found that most students studying in University A (67.8%) stated that they had received education about disasters, and this rose to 83.2% in students of University B, which showed that students' disaster education status differed between universities. Of the total participants, 6.8% of University A students received disaster nursing education, while 68.6% of students studying at University B had received education about disaster

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nursing. The authors concluded that it would enhance nurses' performance to organize and implement disaster training programs for nursing students.[29] Consistent with the results of the current study, Al Khalil et al. concluded that participation in exercises and disaster drills improve nurses' preparedness for disaster management.[30]

Given the related factors to the level of competency of the participants, the results showed that 36.7% of students had disaster-related training and 29.6% had exercise training. However, in the study of Nejadshafiee et al., 54% of nurses had a history of disaster training and 62.80% had a history of practical experience.[31] In addition, in Yin Luo et al.'s (2013) study, there was a significant relationship between disaster education and disaster experience and nurses' competency scores in response to disasters.[32] Also, according to the results of the study by Nilsson et al. (2016), students with experience in disaster situations were also more competent.[17] Fung et al. (2009) also found in their study that among Hong Kong nurses, disaster exercises, or drills, are very important and useful tools for disaster response competence.[33]

Conclusion

In general, despite the importance of training courses and exercise in disaster management and their roles in strengthening preparedness for disaster response, these have not been addressed sufficiently for nursing students. Few studies have addressed this issue and so this study emphasizes a need for education in disaster competence, especially in nursing education. Due to the low level of disaster competency among nursing students, conducting exercises and educational programs in this field is useful to increase student readiness. Also, periodically, it should be mandatory for nurses to pass a certain number of training hours to minimize educational disparities between universities, and a disaster nursing compulsory course in all nursing schools should be implemented.

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Conflicts of interest. The authors declare no conflicts of interest.

References

1. **Guha-Sapir D, Scales SE.** Challenges in public health and epidemiology research in humanitarian settings: experiences from the field. *BMC Public Health.* 2020;20(1):6.
2. **Natural Disasters** 2020. Centre for Research on the Epidemiology of Disasters (CRED). Published 2020; EM-DAT file dated February 2, 2020. Accessed June 27, 2020. https://cred.be/sites/default/files/adsr_2017.pdf
3. **Centre for Research on the Epidemiology of Disasters**. EM-DAT: The OFDA/CRED. Universities Catholique de Louvain. Published 2020. Accessed March 7, 2021. https://www.emdat.be/search/node/asia?page=1
4. 2020 Natural Catastrophes. Insurance Information Institute. Published 2020. Accessed February 2, 2021. https://www.iii.org/fact-statistic/facts-statistics-global-catastrophes
5. **Bakhtiari A.** Country Report: The Islamic Republic of Iran on Disaster Risk Management. Iranian National Disaster Management Organization (NDMO) and Visiting Researcher at ADRC. Published February 2014. Accessed February 14, 2021. http://www.adrc.asia/countryreport/IRN/2013/IRN_CR2013B.pdf
6. Disaster. UNDRR—United Nations Office for Disaster Risk Reduction. Published 2020. Accessed March 2, 2021. https://www.undrr.org/terminology/disaster.
7. **Abbasabadi Arab M, Khankeh HR, Mosadeghrad AM, Farrokhi M**. Developing a hospital disaster risk management evaluation model. *Risk Manag Healthc Policy*. 2019;12:287–296. doi: 10.2147/RMHP.S215444
8. **Health Emergency and Disaster Risk Management Framework.** World Health Organization. Published 2019. Accessed March 8, 2021. https://www.who.int/publications/i/item/9789241516181.
9. **Alim S, Kawabata M, Nakazawa M.** Evaluation of disaster preparedness training and disaster drill for nursing students. *Nurse Educ Today.* 2015;35(1):25-31.
10. **Karami A, Farokhzadian J, Foroughameri G.** Nurses' professional competency and organizational commitment: is it important for human resource management? *PLoS One.* 2017;12(11):e0187863.
11. **Bahrami M, Aliakbari F, Aein F.** Iranian nurses' perception of essential competences in disaster response: a qualitative study. *J Educ Health Promot.* 2014;3:81.
12. **Veenema TG, Burkle FM Jr, Dallas CE.** The nursing profession: a critical component of the growing need for a nuclear global health workforce. *Confl Health.* 2019;13:9. doi: 10.1186/s13031-019-0197-x
13. **Loke A, Fung O.** Nurses' competencies in disaster nursing: implications for curriculum development and public health. *Int J Environ Res Public Health.* 2014;11(3):3289-3303.
14. **Inkaew W, Chompunud S.** Effects of an interactive teaching method on perceived disaster nursing competencies of undergraduate nursing students. *Health Emerg Disaster Nurs.* 2018;5(1):25-31.
15. **International Council of Nurses (ICN)**. *Nurses and disaster preparedness.* International Council of Nurses; 2016.
16. **Siemon M, Hackwith J, Monson K.** Development of a disaster nursing competencies assessment instrument for baccalaureate nursing education. *J Nurs Educ.* 2019;58(4):229-233.
17. **Nilsson J, Johansson E, Carlsson M, *et al.*** Disaster nursing: self-reported competence of nursing students and registered nurses, with focus on their readiness to manage violence, serious events and disasters. *Nurse Educ Pract.* 2016;1(17):102-108.
18. **Hung MSY, Lam SKK, Chow MCM, Ng WWM, Pau OK**. The Effectiveness of Disaster Education for Undergraduate Nursing Students' Knowledge, Willingness, and Perceived Ability: An Evaluation Study. *Int. J. Environ. Res. Public Health*. 2021; 18:10545. https://doi.org/10.3390/ijerph181910545
19. **Latif M, Abbasi M, Momenian S.** The effect of educating confronting accidents and disasters on the improvement of nurses' professional competence in response to the crisis. *Health Emerg Disaster Q.* 2019;4(3):147-156.
20. **Sheikhbardsiri H, Khademipour G, Nekoei-Moghadam M, Aminizadeh M.** Motivation of the nurses in pre-hospital emergency and educational hospitals emergency in the southeast of Iran. *Int J Health Plann Manage.* 2018;33(1):255-264.
21. **Öztekin SD, Larson EE, Yüksel S**, AltunUğraş G. Undergraduate nursing students' perceptions about disaster preparedness and response in Istanbul, Turkey, and Miyazaki, Japan: a cross-sectional study. *Jpn J Nurs Sci.* 2015;12(2):145-153.
22. **Aghaei MH, Ebadi A, Aliakbari F, Vafadar Z.** The effectiveness of disaster management education based on inter-professional approach on military nurses' ability to confront with disaster. *J Mil Med.* 2020;22(1):54-63.
23. **Aliakbari F.** The Explaining Concept of Nursing Competence in Disaster, Designing and Determining Psychometric Properties of Disaster Nursing Competence Questionnaire and Application in Iran: Mixed Methods Study [PhD dissertation]. Isfahan, Iran: Isfahan University of Medical Sciences; 2013.
24. **Yan YE, Turale S, Stone T, Petrini M.** Disaster nursing skills, knowledge and attitudes required in earthquake relief: implications for nursing education. *Int Nurs Rev.* 2015;62(3):351-359.
25. **Kim SK, Ahn EK.** Disaster experience, perception and core competencies on disaster nursing of nursing students. *J Digit Converg.* 2013;11(6):257-267.

26. **Duong K.** Disaster education and training of emergency nurses in South Australia. *Australas Emerg Nurs J.* 2009;12(3):86-89.
27. **Aliakbari F, Ghaedamini M, Deris F, Masoudi R.** Relationship between nurses' decision-making style and their disaster response competencies. *Disaster Med Public Health Prep*. Published online September 23, 2020. https://doi.org/10.1017/dmp.2020.225
28. **Schmidt CK, Davis JM, Sanders JL, *et al.*** Exploring nursing students' level of preparedness for disaster response. *Nurs Educ Perspect.* 2011;32(6):380-383.
29. **Ozpulat F, Kabasakal E.** Knowledge levels of nursing students on disaster nursing and their state of disaster preparedness. *Int J Med Res Health Sci.* 2018;7(8):165-174.
30. **AlKhalaileh MA, Bond E, Alasad JA.** Jordanian nurses' perceptions of their preparedness for disaster management. *Int Emerg Nurs.* 2012;20(1): 14-23.
31. **Nejadshafiee M.** Hospital nurses' disaster competencies. *Trauma Mon.* 2020;25(2):89-95.
32. **Yin Ch-H, Luo Y, Liu L, *et al.*** A disaster response and management competency mapping of community nurses in China. *Iran J Public Health.* 2013;42(9):941-949.
33. **Fung WM, Lai KY, Loke AY.** Nurses' perception of disaster: implications for disaster nursing curriculum. *J Clin Nurs.* 2009;18(22): 3165-3171.

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