




Preparedness of Iranian nurses against COVID-19: An analytical study

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Abstract

Background and Aims: The reasons for the unfavorable performance of hospitals in providing care to Coronavirus Disease 2019 (COVID-19) patients include the lack of preparation, knowledge, and relevant skills, making it necessary to evaluate the preparedness of nurses to respond to COVID-19. Therefore, the present study aimed to investigate the preparedness of hospitals affiliated with Shahrekord University of Medical Sciences during the COVID-19 pandemic in 2022.

Methods: In this analytical study, data were collected from 350 randomly selected nurses who worked in three hospitals affiliated with Shahrekord University of Medical Sciences; demographic information tools and the preparation of nurses for COVID-19 patients were used to collect the data. We analyzed the data using SPSS software version 26.

Results: The mean and standard deviation of the total preparation score was 118.85 ± 0.98 . The lowest (6.80 ± 0.18) and highest (23.35 ± 0.19) average values belonged to risk assessment and management and COVID-19, respectively. The score of nurses' preparedness to deal with COVID-19 was not statistically correlated with age, work experience, and so on. The average preparation score was significantly different in different treatment departments (operating room and COVID-19).

Conclusion: The preparation of nurses was low in dealing with COVID-19. Thus, managers of nursing services should design and implement educational programs to strengthen the nurses' weaknesses and ultimately increase their awareness and skills in dealing with disasters.

KEYWORDS

COVID-19, hospital, nurses, preparedness

1 | INTRODUCTION

On March 11, 2020, the World Health Organization declared the Coronavirus Disease 2019 (COVID-19) disease as a global pandemic.¹ Meanwhile, Iran Ministry of Health and Medical Education

informed the universities of medical sciences in the country in February 2020 that the COVID-19 disease had traversed the country, and hospitals and all health systems should be ready to deal with an unknown and emerging viral disease that is contagious and highly pathogenic.²

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Hospitals are one of the most vital regional and national infrastructures for epidemics of infectious diseases, especially COVID-19.³ In crises, many casualties and victims refer to hospitals to receive healthcare services. The appropriate response to crises requires hospital preparedness for such situations.⁴ In such situations, the preparedness and response capabilities, low vulnerability to accidents, employees' knowledge of potential risks, and crisis management are among the essential challenges of a prepared hospital.⁵ As such, the quality of hospital services is determined by evaluating its preparedness for disasters and accidents.⁶

Nurses, as the largest group of healthcare providers, play an important role in responding to disasters and are actively involved in maintaining health in disaster conditions.⁷ Past experiences have demonstrated their important role in relief and rehabilitation in disasters⁸ as they provide the most healthcare services in hospitals during crises.⁹ Due to the variety of experience and clinical conditions, they are unique among the first groups to appear on the scene and admit the injured people and provide care services.¹⁰

The nurses' preparation and effective response to the crisis lead to positive consequences for individuals involved in disasters.¹¹ The preparation of nurses in crises enables them to have a proper understanding of the crisis,¹² give an appropriate response during critical incidents,¹³ and take appropriate nursing measures to reduce the destructive effects of disasters.¹⁴ Nurses, as the people at the forefront of dealing with COVID-19, are at risk of exposure to it, so their preparation for and response to crises are of critical importance.¹⁵ The records of emerging and re-emerging infectious diseases, as well as the prevalence of the disease of severe acute respiratory syndrome caused by COVID-19 and its pandemicity, and the rate of infection and death caused by this disease, on the one hand, and the need for nurses to be prepared to respond to this disaster, on the other hand, prompted us to investigate the preparedness of nurses at Shahrekord University of Medical Sciences against the emerging threat of COVID-19 in 2022.

2 | METHODS

2.1 | Participants

This analytical study was conducted on 350 nurses (graduate nurses) working in Shahada Lordegan, Hajar Shahrekord, Ayatollah Kashani Shahrekord, Walliasr Borujen, and Imam Sajjad Kohrang hospitals affiliated to Shahrekord University of Medical Sciences. The study population consisted of nurses working in hospitals affiliated with Shahrekord University of Medical Sciences. The inclusion criteria were having at least 1 year of work experience in hospitals affiliated with Shahrekord University of Medical Sciences and being interested in participating. The exclusion criterion was the unwillingness to participate in the study. After signing the informed consent form, the participants completed the questionnaire.

The sample size was 350 people using the following formula:

$$n = \frac{Nz^2pq}{Nd^2 + z^2pq}$$

N is the population size which was set at 2000 people.

Z is the reliability coefficient which was 0.95, that is, 1.96.

d is the value of the permissible error, which was supposedly 0.05.

p is the percentage of preparedness in nurses, and q was the percentage of unpreparedness in nurses because its value was unknown. Its maximum value was 0.5.¹⁶

2.2 | Data collection

The data were collected using a background information questionnaire and nurses' preparedness questionnaire against COVID-19. The tool used in this study was a questionnaire designed by Shariffar et al.¹⁷ The total number of items in the questionnaire was 50. The incident management system had 10 items; risk assessment and management six items; information and communication management six items; psychological approaches five items; the equipment five items; pollution prevention, isolation, and quarantine four items; education and training three items; patient management six items; and new COVID-19 five items. The scoring of the entire questionnaire is such that the score range of 50–89 indicates very low preparation, 90–129 low preparation, 130–170 moderate preparation, 171–210 high preparation, and 211–250 very high preparation. In the study carried out by Shariffar et al., the Cronbach's α coefficient for the entire questionnaire was 0.715. The intraclass correlation coefficient of the whole questionnaire was 0.723.

To conduct the research, we randomly selected 3 out of 10 hospitals in Chaharmahal and Bakhtiari provinces. Then, from among the three selected hospitals, 350 individuals were randomly selected from the samples that had the characteristics of the research units and enrolled in the study.¹⁸ They were explained about the research objectives. Then, they completed the questionnaire of demographic information and earthquake preparedness. Finally, the obtained data were analyzed.

2.3 | Data analysis

In this study, data analysis was done through SPSS version 26 software using descriptive statistics and independent t tests, analysis of variance, Pearson's correlation coefficient, and linear regression. The level of statistical significance was considered 0.05 for all tests.

3 | RESULTS

The results of this study showed that 176 participants were women and 174 were men. Most of them had a Master of Science degree (99.7%) and were married (57.1%). Most

participants worked in the emergency department (26.3%). The score of nurses' preparedness to deal with COVID-19 had no statistically significant relationship with age, work experience, education, or marital status. Nevertheless, the average preparation score in different treatment departments had a statistically significant difference. Thus, the highest average belonged to the COVID-19 department with a mean and standard deviation of 129.40 ± 0.51 and the lowest to the operating room department with a mean and standard deviation of 111.50 ± 0.28 . Meanwhile, Bonferroni's post hoc test showed that there is a significant difference between the average score of Covid-19 and the operating room ($p < 0.05$) (Table 1).

The mean and standard deviation of the total preparation score was 118.85 ± 0.98 . The lowest average belonged to the risk assessment as well as the management and psychological approaches, with a mean and standard deviation of 6.80 ± 0.36 and 9.58 ± 0.23 , respectively. However, the highest average was found for COVID-19 and equipment with a mean and standard deviation of 23.35 ± 0.32 and 14.26 ± 0.24 , respectively (Table 2).

4 | DISCUSSION

The results indicated that the average preparation score of the nurses who participated in the present study was low. The nurses' preparedness in the risk assessment and management, psychological approaches, training, and practice was weaker in COVID-19, equipment, quarantine, and prevention of contamination. These results indicate educational weakness in risk assessment and management, psychological approaches, and educational and training sessions.¹⁹ On the other hand, due to the spread of the COVID-19 disease, its high risk, and the adherence of society and health systems with measures taken for dealing with COVID-19, awareness and preparedness in the areas of COVID-19 and equipment have increased.^{20,21} Although few studies have been done in this field, the results of this study are in line with those of some of them.

An example is a study by Oliva et al. entitled "Disaster Preparedness in Hong Kong Nurses." Its results showed that almost none of the nurses considered themselves ready to deal with disasters. About 84% also considered the existence of protocols, training, and exercises for disasters as useful tools for disaster

TABLE 1 Description of demographic and organizational data of the units under research and their relationship with preparedness.

Variable	Classes	Frequency	Percentage	Preparedness		p Value
				Mean	Standard deviation	
Gender	Female	176	50.28	2.38	0.6	0.32 ^a
	Male	174	49.72	2.35	0.58	
Marital status	Single	150	42.86	118.81	0.65	0.06 ^a
	married	200	57.14	120.42	0.63	
Education	BSc	349	99.71	119.36	0.73	0.84 ^a
	MSc	1	0.29	120.02	0.68	
Service unit	Emergency	92	26.29	117.27	0.72	0.0075 ^b
	Pharmacy	16	4.57	102.27	0.41	
	COVID-19	25	7.14	129.40	0.51	
	Men's medical	38	10.85	116.92	0.36	
	Men's surgery	18	5.14	123.72	0.41	
	Women's medical	37	10.57	122.00	0.33	
	Gynecological surgery	36	10.29	120.72	0.92	
	Nursing station	10	2.86	123.10	0.56	
	ICU	12	3.43	123.25	0.48	
	CCU	16	4.57	124.13	0.38	
	Children	14	4.00	117.64	0.63	
	Operating room	36	10.29	111.50	0.28	

Abbreviations: BSc, Bachelor of Sciences; CCU, cardiac care unit; ICU, intensive care unit; MSc, Master of Science.

^at Test.

^bOne-way analysis of variance.

TABLE 2 Descriptive indicators of preparedness score and its subscales.

Variable	Lowest	Highest	Confidence Interval 95%		Mean	SD
			Lower bound	Upper bound		
Incident management system	5	21	11.25	11.82	11.54	0.65
Risk assessment and management	3	12	6.61	7.00	6.80	0.36
Information and communication management	6	23	13.28	13.90	13.58	0.71
Psychological approach	5	21	9.31	9.85	9.58	0.23
Equipment	5	43	13.92	14.61	14.26	0.24
Training and practice	5	43	11.90	12.67	12.28	0.72
Patient management	5	20	13.13	13.77	13.45	0.19
COVID-19	10	38	22.83	23.87	23.35	0.32
Quarantine and prevention of contamination	6	23	13.52	14.14	13.83	0.18
Total preparedness score	55	191	116.83	120.87	118.85	0.98

preparedness. According to the research, Hong Kong nurses were not prepared sufficiently for disasters, but they were aware of the need for such preparation.¹⁰ Of course, this study only investigated disaster preparedness in general, but the present study considered the disease of COVID-19. Öztekin also conducted a study entitled "Japanese nurses' perception: Their preparedness to deal with COVID-19." In general, the results showed that nurses state that felt unable to respond in different disaster situations; they were aware of their workplace emergency plans but did not think they could implement them. The amount of information the nurses needed about knowledge, skills, and incident preparation was overwhelming. They were hesitant to use these skills.¹¹ Tzeng et al. conducted another study entitled "Hospital Nurses' Preparedness to Respond to COVID-19 in Taiwan." They aimed to analyze the perceived preparedness of hospital nurses to respond to COVID-19. The results showed that most hospital nurses were poorly prepared to react to COVID-19. Participants needed more training in the four areas of risk assessment, rapid disaster response, patient management, and self-protection.¹³ Moreover, Mubarak et al. conducted a study on the preparation and response of nurses at the time of COVID-19. The findings of the study showed that nurses had sufficient knowledge about the prevention and response to COVID-19 disease. The personal protective equipment was moderate.¹² However, the mentioned studies have examined areas different from those of the current study.

Kalate Saadati et al. in a study entitled "Nurses' Experiences of the COVID-19 Epidemic in Iran" investigated Iranian nurses' understanding and experience of COVID-19 in Iran. The results showed that none of them had the experience of encountering an epidemic similar to COVID-19. During their studies, none of them had received any relevant training. Most importantly, nurses and doctors lacked awareness and knowledge about COVID-19. In this situation, the themes of poor preparation and low-risk perception scores were among the mentioned factors.⁵ Martin et al. conducted another study⁸ in Chicago and investigated the

preparation of nurses working in Chicago hospitals. It showed that the preparation of nurses against COVID-19 was very low at the beginning of the disease because they had suddenly encountered this disease and unexpected things happened. Gradually, the preparation increased with time and subsequent waves of the disease. Nurses were more prepared in the areas of COVID-19 and used personal protective equipment. Their preparation was lower in risk analysis, cooperation, and coordination processes with other departments and hospitals. The results of this study were somewhat consistent with ours.

One of the reasons for the difference in the results obtained from different research is that in each study, some areas of nurses' preparation were measured through different tools. In general, it can be said that the preparation of nurses is low in most studies, indicating the weakness of education in this field. Therefore, a disaster preparedness training program in the nursing curriculum and regular training sessions for nurses to practice will help them learn faster and get ready for possible disasters in the future.²² Another study found that Chinese nurse preparation was sufficient to respond to COVID-19. Nurses with less than 5 years of work experience and those with diploma reported that they were less prepared to respond to COVID-19. These nurses must receive special training.²³ A study in Indonesia also showed that initially, the nurses' preparation against COVID-19 was low, but with the passage of time and participation in training courses, preparation increased. Also, to maintain preparation, it is necessary to hold continuous training courses.²⁴

Since nurses are important and key elements in disaster management in hospitals, increasing their knowledge, awareness, and skills concerning disaster management can help reduce the destructive effects of disasters. It is suggested that we should design and implement practical and educational programs to increase awareness and skills. The results of this study can be used to increase the effectiveness of nurses' participation in disaster management.

4.1 | Limitations

The limitations of this research included data collection via questionnaires and self-reporting, The variety of educational degrees (master's degree, doctorate, etc.) was low. The small sample size was another limitation of this study.

5 | CONCLUSION

This research showed that the nurses' preparedness in hospitals affiliated with Shahrekord University of Medical Sciences was not optimal. The score of nurses' preparedness to deal with COVID-19 was not statistically correlated with age, work experience, and so on. The average preparation score was significantly different in different treatment departments. Depending on how well-trained nurses are, nursing services managers can create and run comprehensive training programs to help the nurses improve areas in which they have insufficient knowledge. They can also measure how well this training helps the nurses handle crises and improve the quality of patient care.

AUTHOR CONTRIBUTIONS

Milad Ahmadi Marzaleh: Conceptualization; data curation; formal analysis; funding acquisition; investigation; methodology; project administration; resources; software; supervision; validation; visualization; writing—original draft; writing—review and editing. **Mahmoudreza Peyravi:** Formal analysis; funding acquisition; investigation; methodology; project administration. **Nasrin Shokrpour:** Writing—original draft. **Firouz Khaledi:** Conceptualization; data curation; formal analysis; funding acquisition; investigation; resources; software; supervision; validation; visualization. **Rahimali Shaikhy:** Conceptualization; data curation; formal analysis; funding acquisition; investigation; methodology; project administration; visualization; writing—original draft; writing—review and editing. **Vahid Saadatmand:** Resources; software; supervision; validation. **Hassan Khaledi:** Conceptualization; data curation; formal analysis; funding acquisition; investigation; methodology; project administration; resources; software; supervision; validation; visualization; writing—original draft; writing—review and editing.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

All authors have read and approved the final version of the manuscript had full access to all of the data in this study, and take

complete responsibility for the integrity of the data and the accuracy of the data analysis.

ETHICS STATEMENT

Informed consent was obtained from all individual participants in the study. This article results from the research project approved by Shiraz University of Medical Sciences with the code of IR.SUMS.NUMIMG.REC.2022.039. The researcher selected the sample with a letter of introduction from Shiraz University of Medical Sciences. The purpose of the research was explained to the participants, and they were assured of confidentiality. The obtained information was analyzed completely impartially.

TRANSPARENCY STATEMENT

The lead author Hassan Khaledi affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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