Research

Assessing the Levels of Preparedness Against Disaster of the Hospitals in North Khorasan; Iran, in 2016

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ABSTRACT

Iran is considered as one of the disaster-prone nations. Therefore, its hospitals and healthcare centers should be highly prepared to meet crises and disasters. This study aimed to assess the level of preparedness of the hospitals against disasters. This cross-sectional, descriptive study was conducted in nine hospitals in one of the provinces in the north-east of Iran. Data were collected from the hospitals with a checklist that contained 220 items covering 10 areas. The relative mean of preparedness against disaster in the hospitals included in this study was estimated to be 46/40%, which means that according to the criteria of interest, these hospitals were at the average level of preparedness. The mean scores of the hospitals' preparedness against disasters for each of the 10 indices assessed were as follow: 50% for emergency, 33.33% for reception, 33.33% for evacuation, 46.66% for traffic, 41.18% for communication, 49.02% for security, 38.9% for education, 44.44% for support, 41.92% for human resources, and 61.90% for command and management. The results showed that there was a significant positive relationship and correlation between the number of ambulances in the hospitals and the level of preparedness (P<0.05). The level of preparedness against crises and disasters of the hospitals was at an average level. The lowest preparedness levels of the hospitals studied were related to reception, evacuation, and communication. Each of these areas requires more attention and specific measures in this context.

Key words: Preparedness, Disaster, Hospital.

1. INTRODUCTION

Natural and man-made disasters are always a threat to human and material resources. In all parts of the world, such disasters are accompanied by severe financial, physical, and mental complications (1). As one of the top 10 disaster-prone countries, Iran often encounters natural disasters that cause serious damage. Out of every 40 natural disasters, 31 cases occur in Iran, and about 90% of its population is exposed to these events (2, 3). Owing to the unpredicted annual disasters, such disaster-prone countries suffer from economic losses that drive down their gross domestic product (GDP) by 3% (4). As a result of disasters, usual functions come to a standstill and the destructive impact of the disasters compromises a country's ability to meet the healthcare demands (5).

Under these conditions, the hospitals and healthcare centers have key roles since providing rapid healthcare services can lead to decreased mortality and increased rate of survival. In addition, the hospitals suffer from the consequences, damage, and losses resulting from disasters; therefore, they require a coherent plan against these events (6, 7). In critical conditions resulting from unexpected events, the hospitals face several challenges such as the lack of resources, particularly human resources and interference in the normal functions and operations. Lack of planning and organization to cope with disasters, low preparedness level of the hospitals, and the lack of an education program for the staff to meet and control disasters can lead to irreparable damage to the healthcare system in any country (8). High preparedness levels of

hospitals against disasters and crises vary among the countries (9). The results of a study in the United States showed that only 22% of the studied hospitals had an acceptable level of preparedness to cope with disasters (10). In a study by Van Remmen in Netherlands, it was found that 74% of the public hospitals were not sufficiently ready to cope with disasters (11). The results of a study in 2013, conducted in Japan, showed complete preparedness of the hospitals against earthquake in eight cities (12). The results of a study in Iran showed that poor preparedness level against disasters was more tangible in hospitals in the western and southern parts of the county (13). Since disasters negatively affect public welfare and health, effective health care measures should be prepared to guarantee the survival of the society; the disaster management plan should provide rapid healthcare services to decrease the mortality level resulting from a disaster (14). Evidence shows that efficient management practices of hospitals and the healthcare centers during disasters significantly affect their efficiency and performance (15). The results of the studies show that there is a direct relationship between the level of preparedness of the hospitals and the healthcare centers against disaster and mortality caused by natural events and disasters (16, 17). The provision of healthcare services during a disaster is one of the main principles of disaster management; therefore, these services should have sufficient quality and scope to provide healthcare services to the affected population. This study was conducted to assess the preparedness of hospitals in the north-eastern part of Iran, one of the disaster-prone regions of the country. It is expected that by assessing the current state of the hospitals and by identifying the advantages and disadvantages, the authorities will be provided with necessary information to plan for the different parts of disaster management to ensure effective interventions in the future.

2. MATERIALS AND METHODS

This descriptive and analytical study was conducted in one of the provinces in the northeast of Iran in 2016. The samples consisted of all hospitals in northern Khorasan (nine hospitals), studied by the census method in this study. The data collection tool was a checklist that had assessed reliability in previous studies (18). This checklist included 10 demographic questions and 210 main questions in the yes/no format covering 10 areas—namely, emergency (30 items), reception (24 items), evacuation (20 items), traffic (15 items), communication (16 items), security (17 items), education (17 items), support (28 items), human resources (21 items), and commanding and management (22 items). Options "no" and "yes" were assigned the scores of zero and one, respectively. The sums of the scores regarding the preparedness of the hospitals were interpreted as very weak (20), average (41 to 60), good (61 to 80), and very good (above 80). The research team members, after obtaining the required licenses and negotiating with the authorities and managers of the hospitals, collected the data by direct observation and interviews with the experts attached to the different units. They had the checklist referring to each hospital. The hospital authorities were assured of the confidentiality of the sensitive information and were told that if required, the results of the study would be presented to them. SPSS 21 and Excel were used for data analysis. To analyze the data, descriptive statistics (mean, standard deviation, median, percentage frequency) and analytical tests (correlation coefficient) were used.

3. RESULTS AND DISCUSSION

In Table 1, the overall level of hospitals regarding the preparedness against disaster including establishment year, assessment score, area, number of clinical and paraclinical units, number of ambulances, number of clinics, and also capacity of hospitals to admit patients and injured people in critical condition.

Table 1. Overall level of hospitals preparedness in northern Khorasan province

Hospital	Area	Accreditation grade (2014)	Number of clinical units	Number of paraclinical units	Number of ambulances	Number of clinics	Capacity at the time of disasters	Formation of disaster committee
1	5570	1	10	4	3	1	190	1
2	3400	1	4	2	2	1	40	2
3	7464	1	7	2	1	1	170	1
4	18000	1	13	3	3	1	220	1
5	43000	1	7	2	2	1	40	1
6	14000	1	7	2	3	1	40	1
7	-	1	5	2	1	1	40	2
8	17500	1	10	4	3	1	250	2
9	14000	2	8	3	4	3	130	1

According to the findings of Table 1, all of hospitals in this study, except one case (hospital number 9), obtained grade 1 at the final assessment. Among 9 hospitals in this study, preparedness levels of two hospitals were poor, two hospitals were good, and other hospitals were average. Hospital number 2 obtained the lowest score and hospital number 8 obtained the highest score. Generally, the relative mean of preparedness against disaster in the

hospitals of this study was estimated to be 39/24% that according to the criteria of interest, these hospitals were at

poor preparedness level (Table 2).

Table 2. The preparedness state of the studied hospitals against disaster

Hospitals	Scores (% from total score:210)	Status
1	86 (40.95)	Moderate
2	68 (32.38)	Poor
3	105 (50)	Moderate
4	92 (43.81)	Moderate
5	70 (33.33)	Poor
6	97 (46.19)	Moderate
7	130 (61.9)	Good
8	131 (62.38)	Good
9	98 (46.67)	Moderate
Score	88.3 (46.4)	Moderate

The preparedness levels of hospitals in this study have been shown regarding ten units (Table 3). According to the results, the highest preparedness levels of hospitals were related to units including support, emergency, and education; however, the lowest preparedness level was related to reception, evacuation, and communication.

Table 3. Levels of preparedness against disaster of the studied hospitals according to different units of interest

Area	Minimum	Maximum	Mean± SD	percent of preparedness level
Emergency Services	7	25	15± 5.66	50
Reception	3	12	8± 2.95	33.33
Evacuation	5	24	10± 6.32	33.33
Traffic	3	10	7± 2.92	46.66
Safety	2	11	7± 2.65	41.18
Training	6	11	8.33± 2.06	49.02
Communication	4	10	6.22± 1.92	38.89
Human Resources	6	11	9.33± 1.50	44.44
Logistics	12	21	17.33± 3.20	61.90
Commanding and Management	6	15	9.22 ± 2.91	41.92
Total	68	131	97.44±22.43	44.07

To show the relationship between research variables in hospitals (number of clinical units, number of paraclinical units, number of ambulances, and reception capacity in disaster) as well as their preparedness level against disaster,

Spearman's correlation coefficient was used. The results showed that there is a significant positive difference between the number of ambulance in hospital and preparedness against disaster ($P < 0.05$) Table 4.

Table 4. The relationship between the preparedness level of studied hospitals against disaster and the number of clinical units, paraclinical units, ambulance, and reception capacity in critical conditions

Variables	Correlation	P-value
Number of clinical units	0.536	0.137
Number of paraclinical units	0.627	0.071
Number of ambulances	0.764	0.016*
Reception capacity in disaster	0.400	0.286

*. Correlation is significant at the 0.05 level (2-tailed)

The existence of a codified plan against disaster and its management in the hospitals are key aspects of the hospitals' preparedness. Although the Hospital Emergency Incident Command System (HEICS) plan has been submitted to the hospitals, it has not been formally implemented and most of the hospitals do not have any codified plan for coping with disasters (19). In the present study, the preparedness level of hospitals was average, which is consistent with several studies in this field (6, 18, 20, 21). In other studies, the level of preparedness of the hospitals against disaster was poor; for example, the results of a study by Sobhani and colleagues in one of the southern provinces showed that the hospitals had a poor level of preparedness against disaster (9). Murphy and colleagues investigated the preparedness level of the hospitals in the United States and concluded that 80% of these hospitals lacked the necessary plans to cooperate

with other hospitals and only 22% of hospitals were highly prepared against disasters (10). Similar results were obtained in other studies, (11, 22-24). The results of this study showed that the highest levels of preparedness in the hospitals were related to support, emergency, and the education units. Several similar studies demonstrated the highest preparedness level against disaster in the units dealing with emergency, support, education, and traffic (8, 9). The results of a study in 318 Chinese hospitals showed that about 85% of hospitals had an emergency preparedness plan (25). In another study, emergency preparedness level against disaster was poor and the researcher pointed out that most of the problems were due to the lack of equipment, ambiguity in formation, and organizational duties of the triage team members as well as the lack of an organizational structure at the time of unpredicted events and disasters (8). The results of a study

by Treat and colleagues showed a low level of emergency preparedness (26). According to the results of this study, the lowest preparedness levels in the hospitals under study were related to reception, evacuation, and communication. In similar studies, the lowest preparedness level was found in the reception (1, 9, 18). In other studies, the score of this area was acceptable, which is not consistent with this study (24, 27). Since the reception is involved in disaster management and has a direct relationship with other units, its preparedness is very important. It is suggested that for the reception at the time of a disaster, coherent planning should be performed; for example, by estimating the number of victims or considering the triage in this context, it would be possible to facilitate reception at the time of a disaster. The discharge and transfer unit was among the units with the poorest preparedness level. The results of a study by Schultz and colleagues in Los Angles showed that eight hospitals (1995-1996) had discharge and six hospitals immediately performed discharge in 24 hours (28), which is not consistent with the present study. For better transfer and discharge in hospitals, a general estimation should be performed for the event and support needs as well as equipment vulnerability of vehicles and entry and exit routes. All of these issues should be considered in planning and coordinating with the department of motor vehicles of the area. In this study, the levels of preparedness against disaster of the hospitals regarding communication is estimated to be poor while in other studies (18, 21), communication is acceptable. Since one of the consequences of disasters is disorder in communication tools, in order to increase the preparedness of hospitals in the communication context, alternative systems must be available for use when problems occur. The internal communication system should be functional between the different sections of the hospital. Speakers, internal phone lines, and wireless radio are among the alternative communication tools that can be helpful in emergency conditions.

4. CONCLUSION

According to the results of this study, the hospitals in north Khorasan are at an average level of preparedness against disasters. The lowest preparedness levels in these hospitals relate to the reception, evacuation, and communication. Each of these areas requires more attention. Given the history of disasters and crises in this province, more attention from policymakers and authorities is required to redress this.

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AUTHORS CONTRIBUTION

All authors contributed to literature searches, and drafted the initial manuscript; AS designed the research strategy; AS, SHH and RR, coordinated the data-analysis; SHH, AI, MSS contributed to data gathering. All authors read and approved the final manuscript.

CONFLICT OF INTEREST

The authors declared no potential conflicts of interests with respect to the authorship and/or publication of this paper.

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