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Evaluation of the readiness of hospitals affiliated to Isfahan University of Medical Sciences in unexpected events in 2017

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Abstract:

INTRODUCTION: The occurrence of natural disasters such as floods, earthquakes, and storms often has devastating effects on human societies and causes heavy casualties on their inhabitants. By destroying the buildings and infrastructure of society, these events impose a wide range of economic and social burdens on societies and countries. Research in the management of incidental accidents improves the ability to respond correctly in the event of accidents. Therefore, this study was conducted to evaluate the readiness of hospitals in unexpected events in 2017.

METHODS: This cross-sectional study was conducted in 2017 on 10 selected hospitals affiliated to Isfahan University of Medical Sciences. Data collection with the standard checklist included 137 yes/no questions in 10 areas of emergency, admission, transmission, traffic, communication, security, human resources, management, education, and support. At the end of the study, the data were encoded and entered into the SPSS 22 software and were examined.

RESULTS: The results of this study showed that the readiness of hospitals in each of the areas studied was as follows: emergency (79% = good), admission (72.5% = good), transmission (70.4% = good), traffic (58% = moderate), communication (79.6% = Good), security (59.7% = average), human resources (83.6% = very good), management (58% = moderate), education (81% = very good), support (73% = good), and command and management (81.8% = very good).

CONCLUSION: Since hospital conditions are completely changed during a crisis, hospital adaptation to new conditions should be based on the projected plans. As a result, everyone should be prepared to take responsibility according to their responsibilities.

Keywords:

Hospital, readiness, unexpected events

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Introduction

Iran, as a belligerent country, is harmed by natural disasters, occasionally. Annually, 3% of domestic production is lost in countries with unforeseen events.^[1] Iran is one of the top ten countries in terms of natural disaster. Of the five major earthquakes in the world since 1990, there are two earthquakes related to Iran, with the highest casualties related to the two cases.^[2] In terms of disaster, Iran has ranked fourth in Asia and ranked sixth

in the world. Of 40 different disasters, 31 are occurring in Iran and are likely to occur in the future.^[3] Iran as a developing country with a special geopolitical situation over the past 30 years has always been exposed to changes and crises, so crisis management and assessment in the current societies and responsible and accountable organizations is necessary.^[4] Past experiences in Iran have shown that coping with disasters and their complications is a challenge and concern for authorities. Looking back on the past, it can be seen that the Iranian Crash

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Management System is always associated with serious problems.^[3] Incidental events are events that occur in the form of a surprise and sometimes inevitable. These events (due to the wide impact of material, human, and natural disruptions of life) are outside the capacity of communities to adapt. These incidents sometimes lead to human tragedy without financial and international support.^[5] In these situations, a large number of injured patients go to hospitals to benefit from health facilities, so hospital readiness is essential.^[6]

These incidents are hampering the economic and social development of societies. Crisis management and emergency medicine are trying to prevent and prepare for crises in various organizations. At the head of these organizations are hospitals.^[3] Hospitals are the most important places to provide health services. Creating proper crisis management and accurate planning in hospitals is very important.^[7,8] Planning and action in the face of this phenomenon is an effective health service for earthquake victims.^[9] Hospitals are complex and vulnerable institutions. During an incident, an interruption in standard communication, external support services, or supply of materials can disrupt hospital operations. Lack of staff, equipment, and critical requirements can reduce access to safe care. As a result, hospitals should always be prepared for incidental accidents.^[10] In the area of hospital readiness, the identification of hazards by health-care providers leads to increasing the power and standards and reducing the risks of unexpected accidents. Each hospital should have a preparedness plan for unexpected accidents. The main objective of the crisis management plan for hospitals is to provide quick and timely health care to reduce mortality and complications from the unexpected accidents.^[6]

At the heart of any health-care program, hospitals have a special place. The design, organization, and management of a hospital should be such that it does not damage its structures during an earthquake, and it can deliver timely, effective, and efficient services to the disaster.^[9] Today, with the preparation of organizations for dealing with accidents, hospitals must also be able to deal with any crisis and emergency.

The existence of knowledgeable personnel and efficient performance management are required in this regard, and they must have a precise and timely plan to deal with unexpected and emergency situations.^[3]

The unpredictability of accidents increases the pressure on people who are involved in the incident and eliminates the opportunity and the possibility of planning and developing an intervention strategy. The results of the studies in different cities of Iran did not

report readiness for crisis and disaster at acceptable level; therefore, low readiness was reported in the hospitals of Semnan city.^[11]

In one study, readiness of hospitals in Semnan reported low.^[11] Hekmatkhah *et al.* in their study reported poor level of readiness of hospitals in Urmia.^[12]

The lack of planning and organization, the lack of hospital preparation, and the lack of staff training for crisis management can create irreparable damage to the health system of the country and the people.^[3] Therefore, health centers before disasters need to be prepared to be able to respond quickly in disaster situations, since in the event of any disasters and incidents large and small for the community and the people, the hospitals of each region are the first centers referral for the treatment and delivery of services. Given the increasing frequency and consequences of disasters and the special role of health services before, during, and after such incidents, proper preparation of health care providers is essential, so all hospitals and health centers in the cities need active crisis management and have the readiness to deal with emerging crises.

Research in the management of unexpected accidents improves the ability to respond correctly in the event of accidents. In fact, descriptive studies with the aim of describing the present situation and comparing it with the standard and global literature of crisis management put the scientific requirements for planning in different stages of hospital crisis management (prevention, preparedness, response, and recovery) to the managers. Disasters occur in different parts of Iran; therefore, crisis management (to reduce damages), infrastructure identification and assessment of the ability of all treatment centers to plan and respond appropriately must be carried out. This study was conducted to evaluate the readiness of hospitals of Isfahan University of Medical Sciences in unexpected events in 2017.

Methods

This cross-sectional descriptive study was conducted in hospitals affiliated to Isfahan University of Medical Sciences with over 100 beds in 1396, using a census method. At first, 13 hospitals were selected for research. At the end, 10 hospitals completed their questionnaires. The data gathering tool was a standard checklist, which was obtained from the Hojat *et al.*'s test by a test-retest with Kappa test (0.8) and face and content validity by 15 experts. This checklist contains 137 yes/no questions in 10 areas: emergency (including 10 questions), admission (including 15 questions), transmission (including 18 questions), traffic (including 10 questions), communications (including

12 questions), security (including 11 questions), education (including 10 questions), support (including 20 questions), human resources (including 13 questions), and command and control (including 18 questions).

The scoring of the questionnaire was as follows: option yes = score one and option no = zero score. How to rank in five categories is as follows: 0%–20% very weak, 21%–40% poor, 41%–60% average, 61%–80% good, and 81%–100% very good.

After approving the plan, the researcher approached the Ethics Committee of Isfahan University of Medical Sciences and obtained relevant permits and agreed with the managers and managers of the hospitals. To conduct the sampling, first, the objectives of the study and the method of work were explained to the participants in the study. Then the questionnaires were given to them to complete. At the end of the sampling, the data were encoded and entered into SPSS 22 software (IBM Company, Armonk, NY) and examined.

Findings

The results of the data analysis showed that 10 hospitals had the following features: (10.4 ± 3.7) clinical sections, (5.1 ± 4.3) paraclinical section, (1.6 ± 0.6) ambulances and (8.8 ± 7.0) clinic. The highest ranking was by hospitals, and in eight of the hospitals, the crisis committee was formed.

The relative and absolute frequency of readiness and the total score of the hospitals surveyed are reported in Tables 1 and 2. The results of data analysis show the readiness of hospitals as follows: the field of admission (72.5% = good), the field of transmission (70.4% = good), the field of traffic (58% = moderate), the field of communication (79.6% = good), the field of security (59.7% = average), the field of human resources (83.6% = very good), the field of preparedness management (58% = moderate), the field of education (81% = very good), and the field of support (73% = good) [Table 3].

The results of Table 4 show that only one hospital obtained a score of 100 from the check list. Hospital ratings (according to the score obtained according to the checklist) are listed in the table.

Discussion

Throughout history, human beings have always been watching natural and abnormal natural disasters, which would break the normal course of human life and bring them to life, financial, economic, and social life, so that ordinary resources would not respond to these needs.^[13] The World Health Organization considers disasters as a sudden ecological phenomenon that needs

extra-institutional assistance. From the perspective of medical knowledge, an accident occurs when the number of patients reaches a point at a time that requires more workforce and more resources for treatment and care.^[13] Obviously, unexpected events, based on their size, number, and density of population, turn into small or major disasters; restoring conditions to the initial state may be difficult and overwhelming.^[14] The results of this study showed that in the emergency area, the total score was 79%, which was well estimated and only one hospital was in poor condition. In line with the results of this study, the study by Daneshmandi *et al.*, with the aim of evaluating the readiness to deal with unexpected events in one of the selected hospitals in Tehran in 2015, showed that the preparedness of the hospital in the emergency department was good (66.7%).^[13] Furthermore, the study by Kardanmoghadam *et al.*, with the aim of assessing the readiness of Birjand hospitals in dealing with unexpected accidents in 2011, showed that the readiness of the three hospitals was good (67.36%).^[15] The study by Mohammadi *et al.*, with the aim of assessing crisis preparedness and disaster preparedness in trauma centers and incidents in Kermanshah University of Medical Sciences in 2016, showed that the readiness of the three hospitals was good (76.6%),^[3] while the study by Amerion *et al.* reported different results. The study by Amerion *et al.* was conducted with the aim of assessing the readiness of military hospitals to deal with unexpected accidents in 2013; the results showed that the readiness of hospitals in the emergency department was moderate (53.9%).^[16] Investigations have shown that the emergency room is a sensitive place for the implementation of preparedness plans due to direct connection with the injured.^[16,17] So, over time, hospital management on the emergency department (as an important part in crisis situations and unexpected events) is more important.

According to the results of this study, the readiness of hospitals in the field of admission was good (72.5%). However, in the studies by Daneshmandi *et al.*, Amerion *et al.*, Kardanmoghadam *et al.*, and Mohammadi *et al.*, the readiness of hospitals in the field of admission was moderate (41.7%, 46.86%, 58.26%, and 66.41%, respectively).^[3,13,15,16] Considering the importance of registering incident data, it seems necessary to prepare a crisis response form. It should be noted that this department has direct connection with the emergency department in unexpected events and it is very important that it is well prepared. When an incident occurs, the treatment system must be able to accept and treat the injured, so the acceptance conditions are different in normal times with the time of the crisis.^[16,17]

According to the results of this study, the readiness of hospitals in the field of transfer was good (70.4%).

Table 1: The relative and absolute frequency of readiness of selected hospitals in terms of ten goals

Hospitals	Part									
	Emergency (%)	Admission (%)	Transmission (%)	Traffic (%)	Connections (%)	Security (%)	Education (%)	Support (%)	Human resources (%)	Management (%)
Hospital number 1										
Yes	7 (70)	12 (80)	16 (88)	9 (90)	11 (91)	10 (90)	6 (60)	13 (65)	13 (100)	15 (83)
No	3 (30)	3 (20)	2 (22)	1 (10)	1 (9)	1 (10)	4 (40)	7 (35)	0	3 (17)
Hospital number 2										
Yes	10 (100)	15 (100)	18 (100)	10 (100)	12 (100)	11 (100)	10 (100)	16 (80)	12 (92)	17 (94)
No	0	0	0	0	0	0	0	4 (205)	1 (8)	1 (6)
Hospital number 3										
Yes	6 (60)	3 (20)	2 (22)	2 (20)	3 (25)	3 (28)	5 (50)	7 (35)	8 (61)	8 (44)
No	4 (40)	12 (80)	16 (88)	8 (80)	9 (75)	8 (72)	5 (50)	13 (65)	5 (39)	10 (76)
Hospital number 4										
Yes	8 (80)	10 (66)	16 (88)	7 (70)	10 (83)	10 (90)	7 (70)	18 (90)	12 (92)	17 (94)
No	2 (20)	5 (33)	2 (22)	3 (30)	2 (27)	1 (10)	3 (30)	2 (10)	1 (8)	1 (6)
Hospital number 5										
Yes	9 (90)	15 (100)	17 (94)	8 (80)	11 (91)	11 (100)	10 (100)	14 (70)	12 (92)	16 (88)
No	1 (10)	0	6 (6)	2 (20)	1 (9)	0	0	6 (30)	1 (8)	2 (22)
Hospital number 6										
Yes	10 (100)	11 (73)	16 (88)	10 (100)	8 (66)	6 (54)	10 (100)	18 (90)	13 (100)	18 (100)
No	0	4 (27)	2 (22)	0	4 (34)	5 (46)	0	2 (10)	0	0
Hospital number 7										
Yes	9 (90)	13 (86)	10 (55)	2 (20)	8 (66)	4 (37)	8 (80)	5 (25)	4 (31)	11 (61)
No	1 (10)	2 (14)	8 (45)	8 (80)	4 (34)	7 (63)	2 (20)	15 (75)	9 (69)	7 (39)
Hospital number 8										
Yes	10 (100)	9 (60)	8 (45)	0	10 (83)	0	10 (100)	20 (100)	13 (100)	16 (88)
No	0	6 (40)	10 (55)	10 (100)	2 (27)	11 (100)	0	0	0	2 (22)
Hospital number 9										
Yes	10 (100)	15 (100)	18 (100)	10 (100)	12 (100)	11 (100)	10 (100)	20 (100)	13 (100)	18 (100)
No	0	0	0	0	0	0	0	0	0 (05)	0
Hospital number 10										
Yes	9 (90)	6 (40)	5 (37)	0	11 (91)	6 (54)	5 (50)	15 (75)	9 (69)	12 (66)
No	1 (10)	9 (60)	13 (73)	10 (100)	1 (9)	5 (46)	5 (50)	5 (25)	4 (31)	6 (34)
Total	10 (100)	15 (100)	18 (100)	10 (100)	12 (100)	11 (100)	10 (100)	20 (100)	13 (100)	18 (100)

In confirmation of the present study, in the study by Mohammadi *et al.*, the readiness of hospitals in the field of transfer was good (77.7%).^[3] However, in the studies by Kardanmoghadam *et al.*, Daneshmandi *et al.*, and Amerion *et al.*, the readiness of hospitals in the field of transfer was (46.7%, 43.45%, and 45.65%, respectively).^[13,15,16] Transmission and evacuation of patients is one of the main tasks of emergency personnel.^[16] The military border hospital has a high level of training and attention of managers and commanders of the readiness of military centers in the field of transfer and discharge, but in large cities, there is not enough level that can be adequately addressed with a brief planning and allocation of special

facilities for crisis situations. In order to increase the readiness of hospitals, it is possible to consider actions such as emergency steps, equipped entrances, teams and officials to guide patients and conduct periodic maneuvers. According to the results of this study, the readiness of hospitals in the field of traffic was moderate (58%). In confirmation of the present study, in the studies by Amerion *et al.* and Kardanmoghadam *et al.*, the readiness of hospitals in the field of traffic was moderate (58.81% and 52.77%, respectively).^[15,16] However, in the study by Daneshmandi *et al.*, the readiness of hospitals in the field of traffic was poor (33.7%),^[13] and in the study by Mohammadi *et al.*, the readiness of hospitals was

Table 2: Comparison of the preparedness level of selected hospitals in different parts

Hospitals	Part									
	Emergency (%)	Admission (%)	Transmission (%)	Traffic (%)	Connections (%)	Security (%)	Education (%)	Support (%)	Human resources (%)	Management (%)
Hospital number 1	7 (70)	12 (80)	16 (88)	9 (90)	11 (91)	10 (90)	6 (60)	13 (65)	13 (100)	15 (83)
Hospital number 2	10 (100)	15 (100)	1 (100)	10 (100)	12 (100)	11 (100)	10 (100)	16 (80)	12 (92)	17 (94)
Hospital number 3	6 (60)	3 (20)	2 (11)	2 (20)	3 (25)	3 (27)	5 (50)	7 (35)	8 (61)	8 (44)
Hospital number 4	8 (80)	10 (66)	16 (88)	7 (70)	10 (83)	10 (90)	7 (70)	18 (90)	12 (92)	17 (94)
Hospital number 5	9 (90)	15 (100)	17 (94)	8 (80)	11 (91)	11 (100)	10 (100)	14 (70)	12 (92)	16 (88)
Hospital number 6	10 (100)	11 (73)	16 (88)	10 (100)	8 (66)	6 (54)	10 (100)	18 (90)	13 (100)	18 (100)
Hospital number 7	9 (90)	13 (86)	10 (55)	2 (20)	8 (66)	6 (36)	8 (80)	5 (25)	4 (30)	11 (61)
Hospital number 8	10 (100)	9 (60)	8 (53)	0	10 (83)	0	10 (100)	20 (100)	13 (100)	16 (88)
Hospital number 9	10 (100)	15 (100)	18 (100)	10 (100)	12 (100)	11 (100)	10 (100)	20 (100)	13 (100)	18 (100)
Hospital number 10	9 (90)	6 (40)	5 (27)	0	11 (91)	6 (54)	5 (50)	15 (75)	9 (69)	12 (66)

Table 3: Level of preparedness of selected hospitals in different parts

Hospital	Part									
	Emergency	Admission	Transmission	Traffic	Connections	Security	Education	Support	Human resources	Management
Whole hospitals	79	72.5	70.4	58	79.6	59.7	81	73	83.6	81.8

Table 4: Comparison of the preparedness level of selected hospitals

Selected hospitals	Readiness		
	Percentage	Total score	Grading
Hospital number 1	81.75	112	Very good
Hospital number 2	95.62	131	Very good
Hospital number 3	34.30	47	Poor
Hospital number 4	83.94	115	Very good
Hospital number 5	89.78	123	Very good
Hospital number 6	87.59	120	Very good
Hospital number 7	54.01	74	Moderate
Hospital number 8	70.07	96	Good
Hospital number 9	100	137	Very good
Hospital number 10	56.93	78	Moderate

good (68.8%).^[3,13] Of course, it is worth noting that the first pillar is the planning of a communication and information crisis among the organs and hospitals.

According to the results of this study, the readiness of hospitals in the field of communication was good (79.6%). In confirmation of the present study, in the studies by Daneshmandi *et al.* and Kardanmoghadam *et al.*, the readiness of hospitals in the field of communication was moderate (44.7% and 49.07%, respectively),^[13,15] while in the studies by Amerion *et al.* and Mohammadi

et al., the readiness of hospitals was good (68.87% and 79.6%, respectively).^[3,16] Of course, it is worth noting that the first pillar is the planning of a communication and information crisis among the organs and hospitals.

According to the results of this study, the readiness of hospitals in the field of security was moderate (59.7%). However, in the study by Mohammadi *et al.*, the readiness of hospitals in the field of security was good (70.8%).^[3] In confirmation of the present study, in the studies by Daneshmandi *et al.* and Amerion *et al.*, the readiness of hospitals in the field of security was moderate (50% and 69.06%, respectively),^[13,16] which contradicted the results of this study. Security planning for accidents provides the safety of personnel and patients in critical situations and prevents disturbances in health-care facilities. Studies show that one of the major issues of preparedness for disaster is the security issues associated with hospital personnel and equipment during disasters, so that personnel should be familiar with the security issues and instructions and learn the necessary training continuously.^[16,17] According to the results of this study, the readiness of hospitals in the field of human resources was very good (83.6%). However, in the study by Daneshmandi *et al.*, the readiness of hospitals in the field of human resources was poor (61.9%),^[13] in the study by

Amerion *et al.*, the readiness of hospitals in the field of human resources was moderate (51.46%);^[17] and in the studies by Kardanmoghadam *et al.* and Mohammadi *et al.*, the readiness of hospitals in the field of human resources was good (60.92% and 70%, respectively).^[3,15] Since human resources play an important role in managing the hospital and preventing waste of resources, surveys showed that shortage of workforce is critical in a critical situation.^[16,17]

According to the results of this study, the readiness of hospitals in the field of management was very good (81.8%). However, in the studies by Amerion *et al.* and Daneshmandi *et al.*, the readiness of hospitals in the field of preparedness management was moderate (52.40% and 56.11%, respectively); in the study by Kardanmoghadam *et al.*, the readiness of hospitals in the field of preparedness management was good (68.2%);^[13,15] and in the study by Mohammadi *et al.*, the readiness of hospitals in the field of preparedness management was very good (88.4%).^[3,16] Milsten considers the weakness of management and communication in preparedness programs as the most important challenges that must be addressed. The prediction of crisis and crisis factors in management is very important. Because acceptance of the predicted factors is easier, the management can reduce the extent of the crisis, with precise and accurate prediction.^[16,17]

According to the results of this study, the readiness of hospitals in the field of education was very good (81%). However, in the studies by Daneshmandi *et al.* and Kardanmoghadam *et al.*, the readiness of hospitals in the field of education was moderate (41.2% and 44.17%, respectively),^[13,15] and in the studies by Amerion *et al.* and Mohammadi *et al.*, the readiness of hospitals was good (69.61% and 76.4%, respectively).^[3,16] Most major cities have appropriate facilities and appropriate training space for conducting theoretical classes, exercises, and practical exercises, but there are also instructions and detailed descriptions of the appropriate training program for exercising and exercising periodically. According to the results of Soleimani study, the staff of the hospital examined the training for the unexpected events during the various courses and the educational pamphlets have been focused on the colleagues and clients, but their practical and operational awareness is low.^[18] Therefore, hospitals should pay special attention to the training of their employees to improve their performance during the crisis.

According to the results of this study, the readiness of hospitals in the field of support was good (73%). In confirmation of the present study, in the studies by Daneshmandi *et al.*, Kardanmoghadam *et al.*, and Mohammadi *et al.*, the readiness of hospitals in the

field of support was good (64.3%, 65.9%, and 66.41%, respectively),^[3,13,15] while in the study by Amerion *et al.*, the readiness of hospitals in the field of support was moderate (52.58%).^[16] Researches showed that problems such as the lack of surgical bed and the lack of financial resources are one of the most important problems of hospitals in critical situations caused by unexpected events, especially in border cities.^[16]

Most of the weaknesses in hospitals are in the operational area – all instructions and processes have been identified during the crisis – but no resources have been taken to save resources during the crisis for drugs, water, and food. Since all efforts by aid forces depend on the amount and importance of support, serious planning of the authorities in this field can help to promote this unit.

Conclusion

The results of this study showed that the readiness of hospitals in each of the areas studied was as follows: emergency (79% = good), admission (72.5% = good), transmission (70.4% = good), traffic (58% = moderate), communication (79.6% = good), security (59.7% = average), human resources (83.6% = very good), management (81.1% = very good), education (81% = very good), and support (73% = good). All hospitals must have a strategic, comprehensive, and standardized plan to deal with unexpected events, but unfortunately, most of these programs are forgotten to take into account the daily needs of the hospital to provide appropriate services. Since hospital conditions are completely changed during a crisis, hospital adaptation to new conditions should be based on the projected plans. As a result, everyone should be prepared to take responsibility according to their responsibilities. It should be noted that conducting researches and studies on the degree of readiness of medical centers on a regular basis and benefiting from the results of internal and external research can help improve the weaknesses in this direction. No activity is preferable to another, so the results of such studies will be useful in determining the strengths and weaknesses. Weakness in management and communication, structural problems, lack of facilities, inappropriate organization of human resources, and other resources are the main problems of hospitals in dealing with unexpected events.

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Conflicts of interest

There are no conflicts of interest.

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