ORIGINAL RESEARCH

Challenges of Hospital Response to the Twin Earthquakes of August 21, 2012, in East Azerbaijan, Iran

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ABSTRACT

Objective: As the cornerstone of any health system, hospitals have a crucial role in response to disasters. Because hospital experiences in disaster response can be instructive, this study examined the challenges of hospital response to the twin earthquakes of 2012 in East Azerbaijan, Iran.

Methods: In this qualitative study, the challenges of hospital response in the East Azerbaijan earthquakes were examined through focus group discussions. Participants were selected purposefully, and focus group discussions continued until data saturation. The data were manually analyzed by using Strauss and Corbin's recommended method.

Results: Hospitals were faced with 6 major challenges: lack of preparedness, lack of coordination, logistic deficiencies, patient/injured management, communication management, and other smaller challenges that were categorized in the "other challenges" category. The main theme was the lack of preparedness for disasters.

Conclusion: Although hospital preparedness is emphasized in credible references, this study showed that lack of preparedness is a major challenge for hospitals during disasters. Thus, it seems that hospital officials' disaster risk perception and hospital preparedness should be improved. In addition, hospital preparedness assessment indexes should be included in the hospital accreditation process. (*Disaster Med Public Health Preparedness*. 2017;page 1 of 9)

Key Words: disaster, hospital response, earthquake

Iran is one of the most disaster-prone countries because of its size, geographic location, and climatic diversity.[1,2] In the past century, Iran has experienced about 181 disasters, which have led to approximately 160,000 deaths and >170,000 injuries and have affected more than 44 million people.[2,3] On average, approximately 4000 people were killed and 55,000 were affected annually in the past 10 years.[3]

Many human needs arise after a disaster, especially the need for health services as a result of the destruction of infrastructure, disintegration of social organizations, and interruption of daily life.[4,5] Medical services are the main factors for human survival in disasters,[6] and hospitals are the first and most important component providing medical services in communities.[6,7] Timely and effective responses of hospitals play a vital role in reducing causalities.[6,8] Credible evidence suggests that hospital preparedness and timely services can significantly decrease mortality in disasters.[9-11]

Given the key role of hospitals and the fact that many of the hazards are not predictable, hospitals must always be ready to respond to disasters. For this reason, accreditation agencies, such as the Joint Commission on Accreditation of Healthcare Organizations (JCAHO), require hospitals to have a response plan, practice it at least twice a year, and evaluate the results to improve preparedness.[12] Obviously, the scenarios for the exercise can never be perfect because many circumstances differ from actual disaster conditions.

On August 21, 2012, 2 earthquakes measuring 6.2 and 6.3 on the Richter scale struck Heris, Varzaqan, and Ahar counties in Iran.[13] The earthquakes killed 306 people and injured more than 3000. Despite structural damage and evacuation of its second floor, Ahar Baqeraluloom Hospital had to admit and provide medical services to a large number of injured people. In addition, some hospitals in Tabriz were involved in providing medical services for the earthquake victims. These hospitals experienced the challenges of hospital response to disasters. Regarding the worthwhile role of this experience, this study aimed to examine the challenges these hospitals faced in response to the disasters.

METHODS

This qualitative research study was conducted by using the grounded theory approach with regard to

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the aim of the study. The study was conducted in Ahar (Ahar Baqeraluloom Hospital), Heris (Emam Hossein Hospital), and Tabriz (Sina, Imam Reza, and Shohada Hospitals). After obtaining the approval of Tabriz University of Medical Sciences (Tabriz, Iran), researchers contacted hospital officials to coordinate the focus group discussions.

Study participants were purposively selected from health system administrators, physicians and nurses, staff of paraclinical centers and pharmacies, and officials of supporting units. Study inclusion criteria were active involvement in the response phase and people's interest. The number of participants in each focus group discussion ranged from 9 to 11. Participants were invited to the meetings after coordinating with hospital managers and officials. In the beginning of every focus group discussion, the participants' oral consent was obtained. Group discussions were done in the participants' workplaces (hospitals). The participants did not have to answer any questions they did not want to and could withdraw at any stage of the study. The names and the identities of the participants were kept confidential.

Focus group discussions continued until data saturation. All discussions were recorded by a notetaker who simultaneously recorded the participants' behaviors and gestures. Focus group discussions were conducted in the participants' native language (Turkish) and were translated by one of the members of the research team. All discussions were then transcribed and reviewed again by the participants to correct and confirm their statements (orally). After this stage, the data were extracted. Each focus group discussion lasted 1.5 hours. To ensure the consistency and accuracy of the data, the reflection and feedback method was used during group discussions. To increase the strength and consistency of the data, rich experiences of participants were examined.

The meetings started with a general question: "What challenges and problems did you face in the hospital during the response to earthquakes?" Then, according to the participants' answers, more detailed and specific questions were asked or further explanations were requested.

Manual data analysis began by using content analysis simultaneously with the discussions. The meaning units were identified and codes were extracted; similar codes were deleted. Codes with the same concept were combined, subcategories were formed, and after integration of subcategories, main categories emerged.

RESULTS

Seventy-five individuals participated in the focus group discussions. Detailed demographic features of the participants are shown in Table 1. Data saturation was met after 10 focus group discussions. The analysis of discussions resulted in 490 primary codes. Duplicate codes were deleted and similar codes were combined. This process led to the formation of 27 subcategories. Similar subcategories were merged and 6 main categories emerged: lack of hospital preparedness to respond to disasters, lack of coordination, logistics deficiencies, patient/injured management, communication management, and other challenges (Table 2). The main theme that affected the response of all studied hospitals was a lack of preparedness.

TABLE 1

Demographic Features of the Study Participants

	No.	%
Level of education		
Less than high school diploma	2	2.66
High school diploma	3	4
Associate of science	3	4
Bachelor of science	35	46.66
Master of science	4	5.33
General practitioner	6	8
Specialist	22	29.33
Position		
Nursing	22	29.33
Physician (general and specialist)	30	40
Laboratory technician/radiologists	2	2.66
Logistic officer	14	18.66
Public health officer	9	12
Total	75	100

Lack of Preparedness

Lack of preparedness was the most important challenge for all who participated in the focus group discussions. The participants believed that the other challenges, in a way, were rooted in the lack of hospital preparedness. Five challenges and problems were extracted as subcategories of this main category: no previous training of personnel, no prior planning for disaster situations, no anticipation of needs and failure to meet needs, no attention to the experiences and lessons of previous disasters, and no attention to the facts in the preparedness plans.

Participants had different comments:

> *We were not given the necessary training. (participant 1)*

> *When the earthquake happened, I was in the hospital. I saw people were all terrified, confused, they didn't know what to do, they were hospital personnel, but did not know what to do. (participant 2)*

> *There was no practice before the earthquake. A drill was held seven years ago when… (participant 3)*

Reviewing these statements indicated that many of the staff had not been trained in this regard and no practice had taken place before the disaster. Even if some hospitals had training, it was very limited.

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TABLE 2

Summary of the Focus Group Discussion Analysis

Lack of preparedness
- No previous training of personnel and lack of training programs
- Lack of prior planning for disaster situations
- Failure to anticipate and meet needs
- Lack of attention to the experiences and lessons of previous disasters
- Lack of attention to the facts in preparedness planning

Lack of coordination
- Coordination problems with volunteers who were referred to help
- Lack of coordination among hospital officials
- Lack of coordination among the authorities in different hospitals
- Lack of coordination among the prehospital emergency and hospital authorities
- No Incident Command System and not running if there was any
- Disobeying the orders of officials by personnel
- Intractable performance of tasks by staff
- Absence of command unity and single commander
- Frequent examinations of some injured
- Bewilderment of personnel and officials
- Fragmentation and repetition
- Inappropriate interventions of unrelated individuals
- Unaccountability of officials
- Interventions of crisis management headquarters in the counties

Logistics challenges
- Inappropriate places for providing services to the injured
- Management of donations
- No emergency fund
- Security management
- Human resources management

Technical challenges
- Evacuation of hospitals
- Patient security
- Admission
- Entry and exit management and discharging of injured
- Triage and prioritization of patients
- Providing paraclinical services

Communication and information management
- Contact with the media
- Communication within the hospital
- Out-of-hospital communications
- Management of very important people and visitors

Other challenges
- Management of dead bodies

Many of the participants believed that their hospital had no disaster plan.

> *As far as I know, there is no preparedness plan for disasters. (participant 4)*

> *At least I did not see any in…..hospital. I think nothing has been done since I started working here. (participant 5)*

> *There was no prior plan for disaster management at all. (participant 6)*

> *Hospitals' needs such as supplies, equipment, drugs, manpower, cars, etc. they were not anticipated, provided and saved for disaster situations….We had problems with drugs and equipment, but fortunately we were provided with drugs by the central pharmacy after contacting with the hospital matron and hospital head. (participant 7)*

> *One of our problems was the need for a clean environment at that time. Everyone was stitching, dressing, but since it was so busy we just had to stop bleeding and there was no sterilization. (participant 8)*

Another challenge of hospital preparedness was ignoring the lessons and experiences of past disasters. Participants believed the past challenges were being repeated.

> *I was with…two days after the earthquake who was in Bam earthquake, too. He said that there were the same problems and all the scenes were a repetition of those events in a way. (participant 9)*

> *Nothing has happened after the earthquake. (participant 5)*

> *If an earthquake happens now, believe me, all the problems will be repeated. All of us have forgotten what happened there. We forget them easily. (participant 7)*

Some participants believed planning for disasters is useless because disaster situations cannot really be anticipated and therefore planning will not work effectively. For example, if a hospital is destroyed or personnel are injured, you cannot carry out the plan.

> *…at the meetings, a disaster manager, triage nurse and… are determined, but in the earthquake, such division was not done. (participant 10)*

> *[An] Incident Command System (ICS) chart is valuable when the hospital structure is not destroyed itself; otherwise, even in times of disasters, charts are unworthy. (participant 10)*

> *We have already anticipated the workforce, now this workforce is injured, could he join us in running the plan? The drafts cannot work. (participant 11)*

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Lack of Coordination

Another response challenge was the lack of coordination. This was classified into inter-sectoral and intra-sectoral coordination. The participants believed the lack of coordination affected all actions. According to Iranian disaster management law, there are 14 task forces for emergency support functions. These 14 task forces are under the supervision of an incident commander (governor) and should collaborate with one another and coordinate their activities. The Ministry of Health is responsible for providing public health and medical services in disasters.

The shortcomings caused by the lack of coordination as an obstacle to effective service delivery were as follows: coordination problems with volunteers who came to help, the lack of coordination among hospital officials and among officials of different hospitals, the lack of coordination between prehospital emergency officials and hospitals, the lack of a hospital incident command system and failure to act, staff disobedience to the officials' orders (if there were any), intractable performance of tasks by staff, absence of command unity and a unit commander, frequent examinations of some of the injured, bewilderment of personnel and officials, fragmentation and repetition, unwarranted interventions of irrelevant people and absence of officials' accountability, and interventions of disaster management headquarters in the counties. Sample statements by participants include the following:

There was no inter-sectoral coordination. I, as the head of planning department did not know other sectors' managers and I did not know what to do. (participant 3)

[The] incident command chart was unknown and people's responsibilities were unclear. There was no clear management and the workforce came from anywhere and joined the team. (participant 6)

The other problem was the intervention of irrelevant people. Governor, mayor consider themselves the supreme heads of the city. (participant 12)

I am a member of the disaster management team; however, I have to confess that no meeting was held. There was no coordination among the counties. (participant 3)

The main problem was lack of coordination between main and subordinate organizations. (participant 12)

Logistics Deficiencies

Five challenges were extracted as subcategories in this category, including inappropriate places to provide medical services, donations management, the lack of funds for emergencies, security management, and human resources management.

Both the Ahar and Heris hospitals were destroyed. They prepared a place in the hospital campuses to provide their services, but they were inappropriate both for the injured and for the personnel. They had inadequate sanitation facilities. There was a problem with the heating and cooling systems. Although other hospitals were not damaged, they had the same problems.

There were not a lot of donations in the hospital; however, there were problems in this area. No funding was predicted for emergencies. Although there were no security problems, people were rushing to get aid. Staff members were complaining mainly about the settlements in the hospital campuses and about fear of entering the hospitals. The buildings were not safe enough to enter.

The main problem was the personnel safety. Because the hospital building was damaged and there were still aftershocks. (participant 13)

We were awake at nights and worked 40 days in the tent. (participant 13)

Electrical wires were on the ground in all the tents, sometimes it rained, it was warm in the afternoons and cool in evenings, we had very poor sanitary conditions. (participant 14)

No one would have dared to provide services inside the hospital. (participant 8)

We provided the people with free medicine for 3 days. (participant 15)

We got 3 vans carrying medical supplies for dialysis patients that we did not need, the medical equipment was sent by… (participant 16)

We did not have money as an emergency fund in the early days. We managed with our previous credit. The private sector also supported us. However, if we had not cooperated, we would have faced with serious problems. (participant 5)

In the human resources management subcategory, there were 3 more challenges, including recalling of staff and volunteers, organizing and distributing responsibilities, and the lack of social and psychological support of personnel and their families.

Indeed, no staff recalling was done. After locating their families in a safe place, personnel came to the hospitals themselves. This could have been because of the lack of communication and the lack of preparedness.

There was no duty dividing plan for staff and volunteers. Anyone was engaged in the response at his or her own

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discretion or at the request of a colleague. In some cases, he or she did tasks that did not relate to his or her main job.

Almost all personnel were dissatisfied with the support they received during the response period, especially on the first day. They were not appreciated, at least verbally.

No one called me, I took my family to my sister's home to feel comfortable, and I went to the hospital. (participant 16)

Most of them voluntarily came to help. (participant 17)

We were asked to call the colleagues but we could not. (participant 14)

Most of the emergency colleagues came without contacting. (participant 7)

If we had had one injection, there would have been 50 people to do it. (participant 16)

In the first hours I was busy with my family, after I had found a safe place for them, I came to the hospital. (participant 17)

I took my family to the hospital and camped in the hospital campus because I could not leave them alone. (participant 11)

After the earthquake I took my family to the park where we camped. (participant 9)

In the first moments, we were thinking of the children and our families, the phones were disconnected. (participant 18)

The whole staff faced with a shortage of tents. If their families were in a safe place, they felt relieved. (participant 17)

We had no expectations, Dr…did not appreciate us, none of our colleagues were appreciated. (participant 19)

Patient/Injured Management

Four problems were extracted from the focus group discussions, including evacuation of hospitals and patient safety, admission, management, exit and discharge of the injured, and triage and paraclinical services. The Heris hospital was totally destroyed and one floor of the Ahar hospital was also destroyed. These hospitals had to be evacuated. No special preparedness instructions had been provided for hospital evacuation. The personnel and patients who were able to move with their fellows left the hospitals. After the second earthquake, the rest of the patients were taken out by the staff. In Tabriz, only one hospital was evacuated.

We went to the yard. Some of the patients and their relatives came to the yard. (participant 3)

Our patients could not be transferred and we stayed with them. (participant 20)

We went into the yard but nobody could go and bring the patients who were in the burn ward. (participant 21)

Hospital patients were moved to hospital campus, some patients were taken home by their fellows, but some patients in need of care were moved to the hospital campus. (participant 20)

We went inside the hospital at the cost of our lives 15 minutes after the earthquake to bring the needed things. (participant 21)

The head of one of our colleagues was hurt by falling bricks. The doors were locked, and we found a piece of metal and opened them. (participant 18)

Prehospital emergency medical services are responsible for the initial evaluation and distribution of disaster victims to hospitals. Their presence in such scenes could reduce the influx of people to hospitals and hospital workload. Although Iran's prehospital emergency services is in charge of triage and providing emergency services in the field, it was not practical owing to the large number of destroyed villages and the resulting large number of victims. The injured people and their relatives transferred the wounded to the hospital by any means available.

The first arriving wave was from cities. The majority of them were outpatients at first. Thus, the hospitals experienced crowding in the early hours. Meanwhile, when the critically injured reached the hospital, there was no place for them. There was no problem in the hospitals of Tabriz about 2 hours after the earthquakes. After that they began admitting victims.

Discharging patients was another problem Tabriz hospitals were faced with. The earthquakes occurred at about 6 pm and after 2 hours, the injured, most of whom were outpatients, were transferred to Tabriz hospitals. After getting services, they had to be discharged. This posed a challenge because it was really difficult to go back to Ahar, Heris, and Varzaqan at midnight.

Most people who came to Tabriz were outpatients; their problem was not critical and they did not need any surgeries. (participant 23)

First we visited those who were frightened and tried to calm them down using tranquilizers. A little bit later, earthquake patients were brought. (participant 24)

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In the hospital campus, everyone was carrying a patient on their shoulders. (participant 25)

People were rushing into the hospital and we could not control. (participant 25)

Five hours after the earthquake, around 10:30 or 11:30 night, the last injured was transferred by ambulance. At 11:30 pm, nearly 600 people had been referred to the hospital. (participant 25)

All entrances were closed and it was terribly crowded. They let only the patients in. The patients' fellows usually are not allowed in the wards, but because of the event, they are. (participant 23)

The next problem was the discharge of injured. There was nobody to discharge them at midnight or 1 am. They had no car. Many did not have any relatives. (participant 25)

Triage was not done in Ahar and Heris hospitals, and all the injured were admitted and transferred. However, in some provincial hospitals, triage was done, and in some cases the results were good.

Triage cannot be done in such situations. First we helped those who were rushing for help we tried to do triage but it is not possible in Iran. (participant 18)

There was a certain individual for doing triage. (participant 26)

First the dead were brought and we did not touch them at all. (participant 26)

Triage was not done at first because it was not organized, but then we got some colleagues to be in charge of triage. (participant 27)

Any transferred patient I saw in ambulance was either green or dead. As it turned out, their triage was wrong, and we had some dead among them who were unreasonably taken to emergency. (participant 28)

In Ahar and Heris hospitals, paraclinical departments such as radiography and laboratory were left inside. Because it was risky to go into the hospital buildings, there were some problems in providing diagnostic services in the first moments following the disaster.

We could not get lab equipment out of the building. We were afraid of going inside. (participant 29)

Radiography ward was not damaged but we were afraid of going inside. Patients who needed radiology were taken inside; we did it quickly and came out. (participant 30)

Communications Management

There were several challenges in this category: communication with the media, communication within the hospital, out-of-hospital communications, management of very important people, and people visiting hospitals.

After the earthquake, local phones in Ahar and Heris failed. There were problems with hospital phones in Tabriz, too. Although local, intercity, and mobile phones were not cut off, there were connection problems owing to the spike in call traffic. The personnel could not contact each other and it was very difficult to contact other parts of the province.

Various people from other counties, provincial offices, and national offices regularly visited the hospital. Their presence was not helpful in many cases because responders had to accompany them, which stopped them from doing their main tasks.

Patient information could not be recorded in Ahar hospital and patients were admitted and even transferred without personal information. This problem was solved after the first few hours. A file was opened for every injured patient with the minimum of information and their names were recorded in the books.

To determine our status, we wrote on hospital doors. (participant 31)

Next problem was our own internal communications. (participant 32)

The phones were disconnected in the early hours. (participant 23)

I didn't hear of my family and most of the news on radio and television was about Ahar and Varzaghan. (participant 33)

I called…repeatedly, but there was no answer. (participant 13)

…then we wanted to get information and realized that the phones were cut off. (participant 33)

The telephone lines were busy throughout the city. (participant 14)

There were communication problems with the media. (participant 34)

Some media were there to magnify the problems and report them to. (participant 35)

One of my duties was taking visitors to the hospital wards. Three groups visited every day. (participant 36)

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Various people came, the governor, government officials, university chancellor, university deputy, minister, minister deputy and many others. (participant 5)

Visitors frequently made promises but no problem was solved. (participant 36)

Other Challenges

In addition to the challenges mentioned, there were additional items that could not be placed in a special category. Among these problems was the management and storage of dead bodies.

There were some problems in bigger hospitals due to the large number of staff and volunteers who came to help with no identification cards. Some abused the situation.

For example, one study participant said,

I pulled the doctor who had come to take an ampoule, I thought he wanted to steal, I noticed that it was the doctor. (participant 37)

DISCUSSION

In this qualitative study, we studied the challenges of hospital response to the twin earthquakes in East Azerbaijan Province, Iran. Analysis of the interviews led to the formation of 6 categories and a major theme.

Health facilities, such as hospitals, have a vital role in reducing the adverse health effects of disasters.[6,8,14] Response requirements should be anticipated, and facilities must be considered in the required place and time.[7] Accordingly, accreditation organizations require hospitals to have a preparation plan and preparedness for disaster response.[13] Hospital preparation and having programs for disasters are obligatory in many countries.[15] Nonetheless, the results of this study suggested that the hospitals were not ready. Lack of preparedness was a challenge frequently mentioned in previous studies.[16-18] In the Haiti earthquake, the studied staff felt that they were not ready.[19] In a study by Bahrami et al,[20] the study subjects emphasized the preparation and previous training of staff on their duties, responsibilities, and working conditions in disasters. In a study by Khankeh et al,[18] the lack of plans for providing health care and the need for pre-preparation and development of preparedness plans at different levels were emphasized. In a case study on the response to the September 11 attacks in the United States, it was shown that the majority of those who joined the response as volunteers had no previous experience or training, which led to self-injury.[21] In this study, in addition to training and preparedness, specialized training related to specific conditions was also emphasized.[21] In a study that examined the capabilities and limitations of disaster management, it was noted that there was no written action plan in the field of disaster or, if present, it was not run correctly.[22] Masoudi Alavi[19] noted that although some actions have been taken after the Bam earthquake to make the hospital prepared, the health system is not yet prepared, as shown in the Azerbaijan earthquake. In their study, Nakhaei and colleagues discussed that the lack of preparation was one of the challenges of the health sector in response to past disasters.[23]

The results of this study are completely consistent with previous findings concerning hospitals and their personnel preparedness for disasters. It was expected that the hospitals would be prepared 10 years after the Bam earthquake. The results show that even though Iran is prone to earthquakes and other disasters, particularly catastrophic disasters that affect our towns and villages, and considering the vital role of hospitals in disasters, we are not yet prepared.

When disasters happen, they destroy infrastructure and the foundations of society and disrupt people's daily lives.[4] Therefore, many organizations should participate in response to the effects of disasters, and even within a single organization, several units should play a role. According to literature, coordination is the essence of effective response[20,24]; otherwise, resources will be wasted. There should also be coordination in terms of hospital response. Hospitals meet the consequences of disasters in terms of health; however, both the hospital itself and its staff are also affected by the disaster. An effective hospital response requires the coordination of various wards of the hospital and other organizations. Despite the importance of coordination, lack of coordination was one of the most important challenges in response to the East Azerbaijan earthquakes in 2012. In many previous disasters, such as the September 11 and Bam disasters, coordination was also one of the most important challenges.[18,21,25]

Hospitals are complex organizations that need support from different areas to continue their services. One of the most important factors in maintaining the performance of hospitals in response to disaster is providing the necessary resources, including human resources, equipment, supplies, money, and physical space. Apart from Ahar and Heris hospitals, which were evacuated because of the destruction and provided services on the hospital campuses, other hospitals had no problems in terms of finding locations to provide services. The management of people's donations to the hospitals was another challenge. The lack of social and psychological support of personnel was also another important challenge in this study. Although the staff played an important role in the hospital, they and their families did not receive any financial, emotional, or psychological support. Similar problems have been reported in previous studies. In the Jos riots, running out of required items and medicines, personnel at risk, and exhaustion of staff were some of the problems identified.[26] Lack of place for the provision of services and the shortage of beds were among the problems in response to the Bam earthquake.[23] In a study by Nekooei Moghaddam et al,[27]

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logistics was 1 of the 4 main themes. During Hurricane Sandy, the nurses working in the hospitals evacuated because of the hurricane found the job stressful, and they were not satisfied with the unfamiliar environment and emphasized the need for psychosocial support.[28]

Following disasters, especially earthquakes, evacuation must take precedence. For example, after Hurricane Katrina, the Northridge earthquake, and Hurricane Sandy, hospitals were evacuated.[28-30] Hospital evacuation is difficult and planning an evacuation is even harder. In some cases, patients should be discharged. In other cases, patients are happy and they themselves leave the hospital. Yet other patients should be discharged based on previously established plans. In this study, although there was no previous plan for evacuation, Ahar and Heris hospitals were evacuated, and hospital personnel frequently mentioned problems they faced during the evacuations.

Prioritization of patients has been recommended in all references under any circumstance to allow for the efficient use of limited resources. This is extremely important in disasters because resources are more limited than in normal times, and the number of those needing help is also very high. As a result, patients have to be triaged. However, triage in disaster is different from the usual hospital triage. The lack of triage in the field, and at Ahar and Heris hospitals, was reported as one of the problems in some previous disasters, such as Jos.[26] It should be noted that triage is hard work and requires prior preparation.

The aim of communication in disasters is the coordination of responses among respondents, mobilization of resources, prevention of fear and rumors, behavior improvement, and support for the affected.[31] Therefore, the development of multi-layer connectivity is a key component in hospital preparedness. Communication usually is disrupted in the first moments of the disaster due to the damage to infrastructure or to the increased number of calls. This was true for the present study; because the hospitals were not prepared in advance, they faced challenges and their responses were affected.

In a study conducted in China to examine the developments and challenges of disaster management, it was pointed out that despite the improvements made since 2003, there are still challenges, such as the lack of a specific disaster plan, poor coordination between hospitals, the lack of portable medical equipment, the lack of triage skills, increased capacity, psychological interventions, and emergency funding and support.[17]

CONCLUSION

Hospitals are complex organizations. They have their everyday problems. Their managers are faced with a sea of repeated challenges and sometimes experience new difficulties also. Financing, maintenance of structures and equipment, personnel management, and responsiveness to customers' increasing demands are some instances of hospital managers' routine predicaments. These challenges occupy the mind and spirit of managers. Thus, managers can often forget that one day they may be forced to respond to emergency situations like disasters or be affected by them. They are so busy that they do not have the opportunity to update their own disaster plans and practice them.

Although Iran is a disaster-prone country and hospitals have an important role in reducing mortality and disabilities, this study showed that hospitals have not yet adequately prepared. There are coordination, communication, and logistics problems in disaster response. Above all, the support of personnel in disaster response is still an ignored point in the Islamic Republic of Iran. Hence, some procedures, including hospital preparedness, should be added to the strategic and operational plans of hospitals. More weight should also be given to this issue in accreditation. Finally, specialized units in the Ministry of Health should consider training programs and incentives to promote understanding of disaster risks by managers and hospital staff, as one of the priorities of the Sendai framework for disaster risk reduction.

Limitations

This study was conducted by use of a qualitative approach and thus had all the limitations of such studies. In addition, the focus group discussions were performed more than 2 years after the earthquakes. Some of the informants were not accessible. They were retrieved or had moved to other cities or places. Also, it is possible that some details of the response process were forgotten because of the time that had passed.

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REFERENCES

1. Araghizadeh H, Saghafi Nia M, Entezari V. Analyzing medical management in disasters: a review of the Bam Earthquake experiences. *J Mil Med*. 2004;5(4):259-268.
2. Ardalan A, Sabzghabaie A, Najafi A, et al. *Hospital Disaster Risk Assessment*. Tehran: Moaffag; 2010.
3. Khankeh HR. *Hospital Preparedness Plan: National Hospital Preparedness Program*. Tehran: University of Social Welfare and Rehabilitation Sciences; 2012.
4. Khankeh HR, Mohammadi R, Ahmadi F, et al. Management of health care services at time of natural disasters. *J Rehabil*. 2006;7(25):49-55.
5. Khankeh H, Mohammadi R, Ahmadi F. Barriers and facilitators of health care services at the time of natural disasters. *Rehabil J*. 2005;6(1):23-30.
6. Maleki M, Shojaie P. Hospitals preparation in disasters: security. *J Health Admin*. 2007;10(28):65-70.
7. Djalali AR, Casteren M, Hosseini Jenab V, et al. Hospital incident command system (HICS) performance in Iran: decision making during disasters. *Scand J Trauma Resusc Emerg Med*. 2012;20(14). doi: 10.1186/1757-7241-20-14.
8. Arab M, Zeraati H, Akbari Haghighi F, et al. A study on the executive managers' knowledge and performance, and their hospitals preparedness against earthquake events and their relationships at public hospitals (affiliated by Tehran University of Medical Sciences (TUMS) 2005-2006). *J Health Admin*. 2009;11(34):7-14.
9. Djalali AR, Hosseinijenab V, Hasani A, et al. A fundamental, national, medical disaster management plan: an education-based model. *Prehosp Disaster Med*. 2012;24(6):565-569.
10. Bissell R, Pinet I, Nelson M, et al. Evidence of the effectiveness of health sector preparedness in disaster response. *Fam Community Health*. 2004;27(3):193-203. http://dx.doi.org/10.1097/00003727-200407000-00006.
11. Powers R, Daily E. *Disaster Nursing*. New York, NY: Cambridge University Press; 2010. http://dx.doi.org/10.1017/CBO9780511841415.
12. Gregory RC, Philip DA, Erik ADH, et al. *Disaster Medicine*. Philadelphia: Mosby Elsevier; 2006.
13. JCAHO Emergency management standards. Response Systems website. http://www.disasterpreparation.net/resources.html. Accessed November 2, 2016.
14. International Institute of Earthquake Engineering and Seismology. Ahar-Varzeghan Twin Earthquakes of 11 August 2012, M_w.6.4 and M_w.6.3. IIEES website. September 23, 2012. http://www.iiees.ac.ir/en/ahar-varzeghan-twin-earthquakes-of-11-august-2012-mw-6-4-and-mw-6-3/. Accessed December 19, 2016.
15. Keim ME, Giannone P. *Disaster Medicine*. 3rd ed. Ciottone GR, Darling RG, Anderson PH, et al, eds. Philadelphia: Mosby Elsevier; 2006:160-172.
16. Talati S, Bhatia P, Kumar A, et al. Strategic planning and designing of a hospital disaster manual in a tertiary care, teaching, research and referral institute in India. *World J Emerg Med*. 2014;5(1):35-41. http://dx.doi.org/10.5847/wjem.j.issn.1920-8642.2014.01.006.
17. Zhong Z, Clark M, Hou XY, et al. Progress and challenges of disaster health management in China: a scoping review. *Global Health Action*. 2014;7:24986. http://dx.doi.org/10.3402/gha.v7.24986.
18. Khankeh HR, Khorasani-Zavareh D, Johanson E, et al. Disaster health-related challenges and requirements: A grounded theory study in Iran. *Prehosp Disaster Med*. 2011;26(3):151-158. http://dx.doi.org/10.1017/S1049023X11006200.
19. Masoudi Alavi N. Disaster: are we prepared? *Nurs Midwifery Stud*. 2014;3(2):1-2. http://dx.doi.org/10.17795/nmsjournal19993.
20. Bahrami M, Alliakbari F, Aein F. Iranian nurses' perception of essential competences in disaster response: a qualitative study. *J Health Promot*. 2014;3:81.
21. Crane MA, Levy-Carrick NC, Crowley L, et al. The response to September 11: a disaster case study. *Ann Glob Health*. 2014;80(4):320-331. http://dx.doi.org/10.1016/j.aogh.2014.08.215.
22. Malekshahi F, Mardani M. Abilities and limitations of crisis management in Shohadaye Ashayer and Social Security hospitals of Khorramabad in 2007. *Iranian J Crit Care Nurs*. 2008;1(1):29-34.
23. Nakhaei M, Khankeh HR, Masoumi GR, et al. Health management in past disasters in Iran: a qualitative study. *Health in Emergencies and Disasters Quarterly*. 2014;1(2):107-115.
24. Pourhosseini SS, Ardalan A, Mehrolhassani MH. Key aspects of providing health services in disaster response stage. *Iran J Public Health*. 2015;44(1):111-118.
25. Khankeh HR, Fallahi M, Ranjbar M, et al. Health management in disasters with focusing on rehabilitation. *J Rehabil*. 2008;9(2):66-72.
26. Ozoilo KN, Pam IC, Yiltok SJ, et al. Challenges of the management of mass casualty: lessons learned from the Jos crisis of 2001. *World J Emerg Surg*. 2013;8(1):44. http://dx.doi.org/10.1186/1749-7922-8-44.
27. Nekooei Moghaddam M, Saeed S, Khanjani N, et al. Nurses requirement for relief and casualty support disasters: A qualitative study. *Nurs Midwifery Stud*. 2014;3(1):1-12. http://dx.doi.org/10.17795/nmsjournal9939.
28. VanDevanter N, Kovner CT, Raveis VH, et al. Challenges of nurses' deployment to other New York City hospitals in the aftermath of Hurricane Sandy. *J Urban Health*. 2014;91(4):603-614. http://dx.doi.org/10.1007/s11524-014-9889-0.
29. Chaffee MW, Oster NS. The role of hospital in disasters. In: Ciottone GR, Darling RG, Anderson PH, et al, eds. *Disaster Medicine*. 3rd ed. Philadelphia: Mosby Elsevier; 2006:34-42. http://dx.doi.org/10.1016/B978-0-323-03253-7.50012-1.
30. Schultz CH, Koenig KL, Lewis RJ. Implications of hospital evacuation after the Northridge, California, earthquake. *N Engl J Med*. 2003;348(14):1349-1355. http://dx.doi.org/10.1056/NEJMsa021807.
31. Medford-Davis LN, Kapur GB. Preparing for effective communications during disasters: lessons from a World Health Organization quality improvement project. *Int J Emerg Med*. 2014;7(1):15. http://dx.doi.org/10.1186/1865-1380-7-15.

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