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**Original Article**

# Key Aspects of Providing Healthcare Services in Disaster Response Stage

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**Abstract**

**Background:** Health care management in disasters is one of the main parts of disaster management. Health in disasters is affected by performance of various sectors, and has an interactive impact on various aspects of disaster management. The aim of this study was to identify the most important themes affecting the healthcare management in disaster.

**Method:** In this qualitative study with a content analysis approach, in-depth interviews in two steps with 30 disaster experts and managers were conducted to collect the data.

**Results:** Eleven themes affecting healthcare management in disasters were identified. These themes were related to human resources management, resources management, victims' management transfer, environmental hygiene monitoring, nutrition management, mental health control, inter-agency coordination, training, technology management, information and communication management, and budget management.

**Conclusion:** Providing effective health care service in disasters requires a comprehensive look at the various aspects of disaster management. Effective factors on the success of healthcare in disaster are not limited to the scope of healthcare. There should be a close relationship and interaction between different sectors of disaster management.

**Keywords:** Natural disaster, Response, Healthcare

## Introduction

Disasters are abnormal events which create great potential losses (1). Some of the disasters are natural such as earthquakes, fires, and floods. However, there are unnatural and man-made disasters like terrorist attacks (2). Some researchers consider disasters as a function of risk and they believe that a disaster can be considered as a serious disruption to the functions of a community or a society as well as incurring material, economic or environmental losses. By the same token, it would have an impact on the ability of the affected community or society to cope with its own resources (3-5).

Different consequences of disasters have been stated by researches. They can encompass the death of so many people, high costs over time (6), great economic and political impacts (7), social and psychological disorders, destruction of infra-

structure, damage to the residential houses, loss of properties, and generally the disruption of social life in societies (8). Among all these, the consequences that may harm the people's health and lives are vital (9). Following a disaster, a significant number of people will need proper healthcare (10). The risk of outbreak is often more in emergencies (11). Disasters reduce the physical health of survivors with injuries, intensifying chronic diseases and decreasing access to the health services (9).

There are three basic criteria for critical situations: first, there must be an expectation of serious harm; second, there must be an expectation that someone can do something to prevent or reduce that harm; and the third criteria, there must be time pressure. Healthcare services would be different in these situations. Disasters need to be followed by quick decisions (12). The consequences of disasters and their impact on delivering health care services put the health care in the agenda of disaster management (13). New approaches to disaster know it as a paradox of the threat and opportunity (14). In the health system, evaluating programs and making known their challenges is necessary in order to improve and implement the reforms (15, 16).

Disasters demand various needs as they are very different according to time, place, and their extent (17). In a critical situation, great efforts should be made to ensure that each person receives proper care and the lives are preserved (18). A well-organized disaster preparedness plan and effective community participation are crucial to mitigate the impacts of a natural disaster (19). Disaster healthcare management is a systematic process, administrative, organizational, and operational decision-making skills and capacities, that deals with the challenges of planning in order to improve and reduce the healthcare consequences of natural disasters (13). The effectiveness of disaster management should be studied in all hazardous countries (20). Iran, a Middle East country with a population of 75 million (21) is a high-risk country (22-24). Several studies in Iran have identified the challenges of healthcare services in response to disasters (13, 25-29). Responding to these challenges requires an operational planning.

The aim of this study was to identify the desired operational examples of health services in disasters to reduce the challenges and promote disaster management. The present study answers two questions:

1- What factors have an impact on the effective management of health services in response stage to disasters?

2- What are the desired functioning examples of health services in disasters?

## Materials and Methods

This is a qualitative study with a content analysis approach. Information was gathered using interviews. Purposive sampling was used to collect samples. Interviewees included 30 disaster management experts who had experience in managing natural disasters over the last decade in Iran. The experts were selected from among the managers of key organizations responsible for disaster management.

These organizations included the Ministry of Health and Medical Education, Red Cross, University of Medical Sciences, fire department, police, municipal, gubernatorial, Wastewater Company, regional electric company, Oil Company and 3 governmental hospitals. The geographic area was Tehran and Kerman. From each department 1-2 persons who had the inclusion criteria were selected. Data collection was carried out in two stages through in-depth interviews.

First, through an unstructured interview, a general question was asked about the most important factors affecting the success of healthcare management in disaster. Then according to the first stage responses, the structured open-ended questions were designed and 30 disaster managers were interviewed. The respondents were asked to cite the operational evidences based on their own experiences. These interviews were conducted face-to-face and each interview lasted approximately 45-30 minutes. The qualitative content analysis method was used to analyze the results. All interviews were transcribed verbatim. The responses were reviewed several times in order to achieve an

overall understanding and to perform the initial encoding. In the initial encoding, all semantic units were written without removing a single word. A separate encoding was conducted for each response and we tried to describe all aspects of the content based on the respondents' points of view as much as possible. In the next stage, semantic similar codes were unified and the responses were categorized. The most important concepts were extracted and summarized from the responses. The obtained data were interpreted and analyzed as much as possible.

## Results

The participants in this study were 30 male disaster management experts with the age range of 35 to 60.Interviewees stated eleven themes affecting the healthcare management. The examples of desirable functions associated with each of the themes are shown in Table 1.

According to the findings presented in the above table, we find that the themes affecting the success of healthcare management in disasters are in fact actions and reactions that should be done at the time of disaster response. The findings show that more examples are related to the management of physical resources, and the lowest examples are dedicated to the budget management.

## Discussion

The results of this study identified eleven themes that had a pivotal impact on the effective healthcare management of disaster. In the following sections, the themes are analyzed.

### *Human resources management*

To minimize the damage and the suffering the disasters might cause, it is important to maximally mobilize all human resources to cope with difficult situations (30). Interviewees stated that in many past disasters, various groups including medical and nursing students, the public and organizational forces came to the region with charitable purposes to provide assistance. The presence of these groups in the effected region did not have any consequences except that it made a chaos in the region as this presence was without coordination and without considering the actual needs of the region. Sometimes, specialties were required to deal with the problems as the ordinary people or a first-grade medical student could not manage those problems. One of the other problems that were stated by the participants was the lack of organization and responsibility for the forces that were present in the disaster area. In many cases, the forces were unused due to the lack of expertise and training to provide the proper assistance relief.

### *Physical resources management*

Natural disasters are led to the destruction of healthcare resources (31). In Bam earthquake, there was the shortage of essential drugs that had to be used in the first day of the disaster. However, the inventory of these drugs in pharmaceutical companies was much less than the expectation. In order to respond quickly to disasters, medical supplies, food, and hygiene items should be stored in the warehouses in case of an emergency.

In many past disasters, there was no control on how to send and receive donations and this led to wastage of many resources. Most of the posted drugs from foreign countries were close to the expiry date, unfamiliar to physicians, with quite different doses in comparison to local drugs; so they were actually unusable. As the basic needs of the disaster were not announced publically, people donated whatever they did not need. In this case, the required needs were not met.

According to the incurring costs of importing these items into the country, foreign aids would not be much economical and if the medication is supplied from internal resources, the waste of costs will be lower. Since different organizations played a part in the disaster zone, they distributed their resources in the regions in a way that was not conducted based on a certain order and this led to the unequal distribution of resources. It is important that an organization such as the Ministry of Health be placed on the top.

**Table 1:** the examples of optimal performance in healthcare management in disasters

| Row | Themes | Examples of optimal performance |
|---|---|---|
| 1 | Human Resources Management | - Dispatching the rescuers is based on the region's needs<br>- The rescuers are presented and organized in the whole region after assigning their tasks<br>- The external rescuers are monitored<br>- Rescuers' welfare facilities are provided<br>- The health rescuers are equipped with personal facilities |
| 2 | physical resources management | - Basic needs are announced to attract donations<br>- The expiry date of medicines is controlled<br>- Before a disaster, the sufficiency and usability of resources are supervised<br>- Needs are met within the country as much as possible<br>- The database resource of healthcare centers is available<br>- The distribution of resources is based on zoning and under the supervision of a center<br>- The possible misuses are prevented |
| 3 | Victims' management transfer | - Triage principles are observed<br>- Sufficient data about the number of public and private ambulances are available<br>- How to cooperate the ambulances of different centers is specified<br>- Victims are transported to medical centers according to the type of injury, not just by considering the distance and the proximity of the centers<br>- The overland routes are opened to carry the victims and air transport facilities are provided |
| 4 | Environmental health control | - Infectious and edible waste materials are collected separately<br>- Burial of human and animal corpses are monitored<br>- A place as the morgue is considered to keep the corpses<br>- Necessary arrangements are considered to prevent the transmission of infections<br>- Temporary toilets and their sewage disposal are supervised<br>- In order to control disasters-related diseases some measures are considered |
| 5 | Nutrition management | - Food supply is different according to disaster stages<br>- For food supply the needs of different groups are considered<br>- Food safety is accurately monitored |
| 6 | Mental health control | - Psychosocial support programs are carried out with the presence of relevant experts<br>- Rescuers are familiar with the principles of psychosocial support in disaster<br>- Psychological supports will continue long after the completion of the disaster |
| 7 | Inter-organizational coordination | - Healthcare staff are identifiable to other agencies<br>- The security of healthcare staff, the necessary facilities, and their required information are provided by different organizations |
| 8 | Training | - Health rescuers have specialized training to deal with disasters<br>- General health educations are regularly offered to the people and rescuers |
| 9 | Technology management | - Capacities for using new technologies such as telemedicine are established<br>- The progress in organizations in terms of using new technologies is consistent |
| 10 | Information and communication management | - The information and statistics of victims and the dead are collected and are announced under the supervision of a center<br>- The map of cities is prepared and the location of medical centers are marked on these maps<br>- Health service organizations coordinate together according to defined organizational communications<br>- The communication of healthcare centers with the damaged area is quickly accessible<br>- The principle of command unity is observed for effective communication and all health forces of different agencies serve under the supervision of one commander (the Ministry of Health)<br>- The victims are respected |
| 11 | Budget management | - There is adequate financial credit to provide the requirements |

With access to a comprehensive database of public and private medical centers, the distribution of resources during a disaster would be much easier under the supervision of the Ministry of Health.
The findings of another study are also consistent with some of the results of our research. They stated that adequate facilities and equipment promotes providing appropriate, timely, continuous and accessible health services (29).

### *Victims' management transfer*

Typically, in disaster situations it is essential that the victims are classified based on priority. Therefore; a place must be considered for keeping victims and doing triage. Other studies also pointed to implementing a disaster triage system as an important issue in healthcare services (32). Well-equipped ambulances should also be used to move the victims. Improper transfer can cause more injury such as spinal cord injury, cardiac arrest, or even death.
Since land pathways will be closed due to destruction, sufficient capacity for airlifting should be provided. It should be noted that the victims should be conveyed to the healthcare centers based on the type of the injury not transferring all of them to the nearest center.
In another study, conflicting statistics of transferred victims, uncertainty of tasks, and lack of systematic monitoring for the victims' transfer were stated as problems of victims' management transfer (28).

### *Environmental health*

Depending on the type of disaster, specific contaminants will be transferred. The most common health problem in a flood is the transmission of diseases via water. In an earthquake, infections are usually transmitted due to the collapse. Health authorities should advise rescuers and other people to use the masks and gloves.
Installing prefabricated toilets and wastewater disposal control are important parts of the environmental health. Filled wastewater wells constructed for toilets and being flowed in the camps, the accumulation of garbage in the city and not collecting them are some environmental pollution factors which were stated by the respondents.

### *Nutrition Management*

In the early days of the disaster, canned foods are often given to the victims but in the following days which the cooking facilities are prepared, foods such as beans, rice etc. should be provided. For food supply we must consider the needs of different groups (33, 34). Using nutrition experts to offer advice, determining the specific diets in times of a disaster, and using health professionals to monitor closely the sites of food and drinking water in terms of preparation, distribution, and storage during the disaster are so crucial.

### *Mental health*

The importance of early and appropriate psychological support for victims of a disaster was explored in some studies in order to prevent immediate psychological distress and long term mental health problems (35, 36). To provide psychological support, a team consisting of psychologists, psychiatrists, social workers, and specialists of neuroscience should be present in the affected area. All rescuers should also be familiar with the techniques of psychological and emotional support for various affected groups including women, children, and the elderly people because the various groups express different emotional reactions to the disaster.
If psychological support programs are limited to the time of a disaster, the states such as fear, anxiety, isolationism, and other mental illnesses may persist long after the disaster. One of the proposed solutions is planning for continued psychological supports until the victims return to a psychological balance by establishing psychological support centers and running them long after the disaster. Mental health in disasters was a matter of attention in several studies (23, 37, 38).

### *Inter-organizational coordination*

One of the causes of chaos and inconsistency in the disaster region can be owing to the inability of identifying healthcare rescuers as they are undetectable from ordinary people. Monitoring and

patrolling the affected area is the responsibility of the police force. This is necessary to prevent the abuse of evil people. Participants stated that many caregiver physicians and nurses in the affected area did not have an identification card or special clothing to be identified from other people.
To maintain public health and provide healthcare services, in addition to care providing organizations, other organizations are also responsible. It seems that providing security by the police force, supplying healthy drinking water by water and wastewater organization, collecting bodies by municipality, opening the roads for easy transportation of the victims by the Department of Road and Transportation, etc. Lack of coordination among these bodies will cause delay in responding. The importance of this theme has been discussed in many studies (13, 25, 27, 29, 39).

### *Training*

Trainings that are essential for the successful management of the healthcare in a disaster include general and specialized training of the health. The health staff should be familiar with how to respond to various disasters and illnesses caused by the disaster. General educations include the dissemination of health messages related to personal hygiene, family planning, etc. Using local radio stations to broadcast warnings and important messages is a good way. Continuing educations in organizations are essential (25).

### *Modern technologies*

Telemedicine system installation is one of the modern technologies that can play a part for victims' treatment in an emergency. This technology is particularly valuable when a disaster occurs in remote areas and the roads entering into the region are closed. In order to exploit these technologies, different organizations should have similar advances in this field. In particular, various medical centers should be equipped with the latest and most up to date technologies for a faster response to the disaster. Technology will increase the efficiency of governments in improving public healthcare services (40).

### *Information and Communication Management*

The unity of command system is an important issue in disaster management (32). Effective coordination is possible only when all formal communications are established via the command line.
In the vast disasters, as the indigenous people who are familiar with the city are affected, the rescuers are unfamiliar with the area. Therefore, the city map will be helpful in identifying the medical centers.
To prevent publishing conflicting information, the detailed information of victims and the dead should be collected under the supervision of a single organization.

### *Budget management*

Special credits should be assigned to healthcare organizations that spend their time to prepare for a disaster. This credit must be used to provide backup warehouses, required reserves, as well as immunization against the disasters.

## Conclusion

The health sector requires potentiality and relationships with other sectors. If this relationship is well established before a disaster occurs, we will have fewer problems in the response stage. The information obtained from the knowledge and experience of disaster managers can be the basis for operational planning of healthcare services in disasters.

## Ethical considerations

Ethical issues (Including plagiarism, Informed Consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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