Review Article

How to Manage Emergency Response of Health Teams to Natural Disasters in Iran: A Systematic Review

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Abstract

Background and Objectives: Disaster as a natural devastating event leads to terrific injuries, morbidities, and mortalities, particularly in developing countries. The aim of this study was to evaluate the management of emergency response of health teams to natural disasters in Iran. **Materials and Methods:** Some international databases, such as PubMed, ISI, and Scopus, were searched to find English articles between May 2000 and May 2019. Finally, 22 published articles were entered into the study. Keywords included "disaster," "flood," "earthquake," "wildfires," "tornadoes," "hurricanes," "drought," "famine," "natural catastrophe," "storms," "avalanche," "health team," and "Iran" or a combination of them in the title/abstracts. **Results:** There were >12618 relevant research articles; in this systematic review, 22 published articles consisted of two interventional, one modeling, nine qualitative and ten cross-sectional studies were included. We used Strengthening the Reporting of Observational Studies in Epidemiology Checklist, a checklist of items that should be included in reports of observational studies for selected articles. The summary of the selected articles the selection process using Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement. **Conclusions:** The findings of the current study revealed that two subjects were important; extra education in the college course and in-service training at hospitals using educational pamphlets and having a special committee to manage the disaster.

Keywords: Disasters, emergency response, health team, Iran

Introduction

Disasters affect the lives of millions of peoples around the world and make it difficult for nations and communities to develop. Disasters are increasing, and their occurrence is destroying the ability of a community to meet the needs and demands of health.[1] One-fourth of the population around the world is at risk from natural disasters. The financial damage caused by disasters in developing countries was estimated at about $ 40 billion in the mid-1960s to reach $ 120 billion in the late 1980s and 1990s.[2] Over the past 30 years, the disaster has doubled worldwide, and the amount of damage and human injury has tripled.[3]

Natural disasters affect the lives of million people around the world and they can cause huge economic and social costs despite the efforts made in many countries to decrease the adverse effects and risk of natural disasters, the damage and costs of many crises are increasing.[4] One of the basic needs of people in emergencies is the health and medical needs. In the event of accidents and disasters, hospitals and health centers have a very important role as one of the first units to provide quick, optimal and timely health-care services can

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decrease the rate of mortality and increase the survivability rate.[5]

Hospitals are also affected by the consequence, damage, and disadvantages caused by disasters, and therefore, they need to develop a coherent plan to deal with such vents.[6] Designing and establishing a specific organization for the management of disasters is essential in a country. Studies of some countries showed that developed countries have an organizational structure of disaster management covering natural and abnormal disasters of which its structural dimensions are characterized by formality, concentration, and complexity.[7]

Crisis management organizations in India, Japan, and Turkey over time have gained more power and are under the lead of the highest executive system, but in Iran, it is under the control of the Ministry of Interior. The rules related to crisis management, over time, have become part of comprehensive laws that determine the tasks and objectives of related organizations. Comprehensive crisis management law in Iran is adopted later than in other countries.[8] Even the training and empowerment of nurses to respond to the needs of the victims of disasters is highlighted by reviewing the curriculum and paying attention to the required content at some units.[9]

Plans to deal with unexpected events and their completion can have dramatic effects on reducing the mortality of patients and those who are victims of such events. Each hospital should set up a plan in accordance with international rules and international standards. Therefore, the health sector, as an active organization in crisis management, as well as hospitals as the first and most important treatment centers for injured people, must be prepared before the crisis, so that they can, at the time of their occurrence, respond well and promptly and at best possible way can improve health care.[10]

In the review study of Sadeghi-Bazargani *et al*.,[11] the management of crisis just in the earthquake of Bam was investigated, as well as in the overview study of Ghanjal *et al*.,[12] the status of health services during Kermanshah earthquake was reviewed. As mentioned, there are some studies that evaluated just one type of disaster, earthquake, but we considered all type of disasters in Iran in this review. Given the increasing frequency and consequences of disasters and the special role of health services in the past, during and after such events, it is very necessary that health-care providers have proper preparation; thus, management of active crisis situation is very important in the hospitals and health-care centers of the cities.[13] Iran is a country in which a lot of disasters happen and the management of these natural disasters is of great importance. Therefore, this systematic review aimed at evaluating the management of the emergency response of health teams to disasters in Iran.

Materials and Methods

Search strategy

In this systematic review, some international databases, such as PubMed, ISI, and Scopus were searched to find English articles between May 2000 and May 2019. Keywords were as following: ((((((((((disaster [title/abstract]) OR flood [title/abstract]) OR hurricanes [title/abstract]) OR drought [title/abstract]) OR earthquake [title/abstract]) OR wildfires [title/abstract]) OR tornadoes [title/abstract]) OR famine [title/abstract]) OR catastrophe [title/abstract]) OR storms [title/abstract]) OR avalanche [title/abstract])) AND (health [title/abstract])) AND Iran [title/abstract])).

The related articles were collected and then the Endnote software was used to enter the references and remove duplicate titles. Afterwards, by searching the titles, studies which had irrelevant purposes were removed, and the remaining studies were assessed by two independent investigators. In this study, the articles published in English and conducted on humans were included.

Data extraction

Data of the selected articles such as the author's last name, study design, year of publication, sample size and the results of each article were collected by two independent investigators. The differences observed in this process were reviewed and revised by a third investigator who was independent of the two previous investigators.

Results

There were >12618 relevant research articles. In this systematic review, 22 published articles (two interventional, one modeling, nine qualitative and ten cross-sectional studies) were reviewed.

The Strengthening the Reporting of Observational Studies in Epidemiology Checklist was used in this study; this is a checklist of items that should be included in reports of observational studies for selected articles. The summary of the selected articles was shown in Table 1.

The selection process using Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement can be seen in Figure 1.

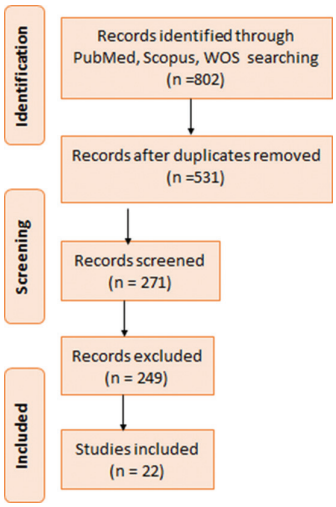

Figure 1: Flow diagram of the processes used to determine references for the systematic review

Table 1: The detail of reviewed articles in this systematic study

ID	First author	Sample	City	Design	Conclusion
1	Lakbala in 2016[14]	200	Hormozgan	Cross-sectional	It can be because of lack of enough hospital beds, low number of personnel, and insufficient medical equipment. In the province, this hospital is the only educational public hospital; so, much attention should be paid to the risk management to this hospital and also to health facilities at the national level
2	Aliakbari in 2014[15]	30	Isfahan	Qualitative	In this study, the technical capabilities required for Iranian nurses during disaster relief were presented. This study investigated that nurses who are in high-risk situations, such as disasters need to have additional competencies. Nurses should be effectively prepared to be responsible in nursing care
3	Moosazadeh in 2014[16]	8	Kerman	Qualitative	During the disaster relief period of the response to the earthquake of Bam, local health organizations were not enough prepared for the disaster. Additionally, delivered donations often had poor quality or expired beyond a usable date
4	Abbasi in 2013[17]	Not reported	Tehran	Modeling	The pioneering nations in disaster medical support teams are now inclined to deploy various teams, compatible with each disaster form or with other effective factors regarding the combination of system. Each disaster will have its own nature and a specific combination of medical services and relief is required
5	Ardalan *et al*. in 2014[18]	224	Tehran	Cross-sectional	Some advices were recommended to improve the efficiency of hospitals in confronting disasters in Iran: Developing a national organization in disaster situation to improve hospitals' safety; surveillance of the performance of safety standards regarding new hospitals' construction; the readiness and safety of nonstructural components needs to be enhanced and structural retrofitting of the existing hospitals, at any time that is cost-effective, needs to be taken into account, and determine criteria for hospitals' accreditation and qualifications regarding the disaster safety status
6	Hosseini Shokouh in 2014[19]	15	Tehran	Cross-sectional	Results indicate a good level of earthquake preparedness prerequisites, but attention needs to be paid to reduce the relevant shortcomings and construction hazards and reinforce these prerequisites, which can affect the structural susceptibility of hospitals and neighboring buildings during earthquake
7	Ardalan *et al*. in 2013[20]	9200	Tehran	Community intervention trial	Disaster awareness and readiness can be improved by administering an educational program by the PHC system. Community disaster intervention programs need to be incorporated into normal public health service delivery for sustainability
8	Djalali *et al*. in 2010[21]	23	Tehran	Cross-sectional	In the Iranian hospitals, the performance level of decision making was intermediate to poor, as calculated during tabletop exercises and applying the HICS proposed indicators. This study also reveals that for measuring the hospital response, the job action sheets of HICS can be utilized as the template. To assess preparedness, simulations can also be utilized
9	Yarmohammadian *et al* in 2011[22]	5	Isfahan	Qualitative	It can be recommended that the related authorities in various levels of the system of health care provide required conditions for implementing the HEICS systems as early as. This study aimed at assisting the health policymakers to achieve a suitable framework and establish HEICS in hospitals. The requirements and opinions of stakeholders before making and planning any health policy are necessary to be taken into account
10	Khankeh in 2011[23]	29	Bam	Grounded theory	This study was conducted to consider the importance of health-service managers in regulating the proper use of international aid using better communication with local and foreign constituents. Moreover, the findings of this study shows that appropriate planning before the events and public training session can lead to quick and accurate response in disastrous situations
11	Djalali *et al* in 2009[24]	323	Tehran	Pre- and post-tests	Establishment of nine regional collaborating centers for disaster management in health-care system in Iran can lead to rapidly and easily accomplish the related programs in the country. A cost benefit and rapid approaches like the tree-shaped model in this study are recommended for performing training programs; this can establish a management plan for disasters in the system of health care throughout a country
12	Nia in 2008[25]	211	Bam	Cross-sectional	The medical and health infrastructures' reinforcing of the country according to the architectural and geographical characteristics plays an important role; also, performing proper air evacuation and the relief missions by the expert relief team has an effective role in the proper management of about 30,000 casualties after a disastrous event, like the Bam Earthquake

Contd...

Table 1: Contd...

ID	First author	Sample	City	Design	Conclusion
13	Montazeri in 2005[26]	916	Bam	Cross-sectional	According to the results of this study, psychological distress levels was high among the survivors of the earthquake. Therefore, delivering mental health care (e.g., psychological counseling) to earthquake victims in local medical centers is necessary and can reduce the negative psychological impacts of the earthquake among the survivors
14	Ainehvand in 2019[27]	26	Tehran	Qualitative	Regarding the emergency foods used after some natural disasters, managers need to consider some characteristics including emergency formulas and food, food safety, food varieties, cultural norms, packaging certificates, and final prices in response plans
15	Feizolahzadeh in 2019[28]	24	Yazd	Qualitative	Barriers' identification in continuity of care for discharged patients for adopting policies based on experiences of health-care providers can help planners to design and implement effective programs, which will increase the patients' access to necessary care.
16	MirMohamadaliIe in 2019[29]	19	Tehran	Qualitative	The challenges of social support, mothers' self-efficacy, educated staff for disasters, and privacy for breastfeeding can be considered as important barriers to breastfeeding in disasters. Training programs, as well as health system support, can help overcome the breastfeeding barriers in disasters
17	Sheikhbardsiri in 2018[30]	990	Jiroft	Cross-sectional	The Joint Commission on Accreditation of Healthcare Organizations reported that organizations must perform the performance preparedness exercises on different levels and areas twice a year to be properly prepared for responding to emergencies and disasters. This study can be considered a suitable standard guide for health care organizations to execute exercises for the maintenance and promotion of their preparedness for properly responding to emergencies and disasters
18	Sohrabizadeh in 2018[31]	22	Bushehr, West Azerbaijan, and Mazandaran	Qualitative	In disastrous regions in Iran, various challenges in the management of reproductive health that have been indicated in the research should be taken into account and included in reproductive health policies. It is highly suggested to involve the community in all stages (planning to monitoring) of providing reproductive health services
19	Taghizadeh *et al* in 2018[32]	361	Tehran	Cross-sectional	Considering to the insufficient prior training courses and the average scores of professional competency for midwives in disasters, additional educational programs are recommended for some midwives
20	Janati in 2018[33]	18	Tabriz	Cross-sectional	The rate of emergency response for Tabriz hospitals was only 54.26% according to the checklist of World Health Organization. Furthermore, emergency responses to disasters in hospitals need to be improved to100%. Designing a comprehensive framework for the hospitals is essential
21	Pouraghaei in 2017[34]	75	West Azerbaijan	Qualitative	Although hospital preparedness is emphasized incredible 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
22	Seyedin *et al*. in 2015[35]	110	Tehran	Cross-sectional	Lack of knowledge of nurses regarding response to disaster situations indicates inefficiencies in the current system. Therefore, it is recommended to organize more workshops, annual training courses, and maneuvers based on staff needs and formulate continuous education courses for nurses

PHC: Primary health care, HICS: Hospital Incident Command System, HEICS: Hospital Emergency Incident Command System

Discussion

Given the vastness of Iran as a country, the diversity of various disasters and the severity of them, the existence of a comprehensive and structured new design for a disaster management system is one of the urgent needs of this country. Using an appropriate model can be effective to economically reduce bureaucratic obstacles and accelerate the process of dealing with disaster management issues.[7] Natural crisis affects the lives of millions around the world, generating economic and social costs. Managing natural disasters can reduce these costs and protect communities from these crises.[8]

Crisis management is a set of executive, managerial and political decision-making processes according to different stages and at all levels of the crisis, to rescue, reduce costs and prevent the mortality and morbidity.[36] In other words, managing is a process for preventing a crisis or minimizing its effects when it occurs. To do this, health team have to plan for the worst situations and then look for ways to manage and resolve it, and include crisis management objectives such as elimination of crisis and

emergency situations; quick return of society to normal situation; reduction of damages from the crisis dealing with financial and physical aspects; reduction of the effects of crisis in the society and coping with it at the lowest cost; preparing the community for coping with the crisis; reconstruction of critical areas physically, mentally and culturally, creating training, exercises and maneuvers in areas to be prepared for managers and people.[37]

Chung in 2016 has compared the crisis management and flood control in the U.S and South Korea. This study is aimed at analyzing the conflict between the actors of the crisis management process. The differences between the two countries are in terms of the spectrum of actors, cultural characteristics and management measures and government agencies, but the motives and behavior of actors in the crisis period were similar in both countries. Based on the comparison, Chung provided important and common solutions for the success of crisis management.[38] This study showed that one of the strategies for solving the problem is comparing the policy of countries.

However, it is essential for hospitals to have a precise and timed schedule to deal with unexpected and urgent situations before the crisis occurs and must provide adequate and theoretical training in this regard.[39] A study in Shiraz showed that the occurrence of irregularities is inevitable in the first few minutes after disasters and accurate management is trying to minimize this time. According to the need of executive managers to conduct "crisis management training courses," it is essential to hold educational classes.[40] A study in Iran described the state of hospitals unpleasant when a disaster occurs, which requires a fundamental review.[41]

In another study in Tehran, the use of educational pamphlets on disaster prevention was introduced as a way to raise awareness.[42] Furthermore, in another study in Iran, the results showed that to improve the disaster management system, measures should be taken, such as reengineering to design a disaster management system, preparation activities, standards and protocols, staff training and regular maneuvers.[43] The subject of education in most studies is presented as a conclusion. In this regard, a study has announced that continuous education for training nursing personnel is one of the topics for coping with disasters.[44] Actually, our systematic review found two subjects very important; one of them is extra education in the university course or while working at hospitals and having a predetermined committee to manage disaster when it occurs. However, other important factors were stated in the mentioned studies such as additional competencies for nurses working at high-risk wards and maneuvers based on nurse's needs. Two main parts of this review (education and mental strategy management) can be presented as follows:

Nurses need to prepare themselves more effectively to be responsible and effective in nursing care during disasters. It can be achieved by regular and systematic training.[15] A study conducted by Seyedin *et al*. showed that organization of more workshops, annual training courses, and maneuvers based on nurse's needs and formulation of continuous education courses for nurses are promising factors to reduce disaster consequences.[35] Taghizadeh *et al*. in 2018 reported a lack of enough knowledge of the medical staff for adaption of medical works during disaster.[32]

Furthermore, Djalali *et al*. and Yarmohammadian *et al*. revealed the key role of disaster management regional collaborating centers with suitable planning to cope with disaster-related problems.[22,24] Albeit, disaster team should consider all aspects of the event in which psychological problem following the disaster is one of the main aspects needing psychological counseling for those who survived the tragedy.[26] Ardalan *et al*. recommended establishing a national committee for hospital safety in disasters.[18] Additionally, Ardalan *et al*. indicated that in societies with more natural disasters, reduction programs must be integrated into routine public health service delivery.[20]

Conclusions

According to the results, using the same actions can manage in the best form: paying much attention to the risk management by giving additional competencies for nurses who care in high-risk situations, considering different need according to the type of disaster, for example, flood is very different with earthquake, enforcing of the constructions especially after earthquake, education in different forms, establishing Hospital Emergency Incident Command System in hospitals, gaining international aids, having some disaster management regional collaborating centers, paying more attention to food health and safety, providing reproductive health services, having intermittent maneuver, and considering the disaster safety status as the criteria for licensing and hospital accreditation process.

Limitations

One of the limitations in the review articles is lack of accessibility for some papers and our review was not excluded from this subject. This review was not able to terminate to the meta-analysis.

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Conflicts of interest

There are no conflicts of interest.

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