Original Article

The challenges of Iranian health system preparedness before earthquakes based on the World Health Organization framework

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Abstract:

INTRODUCTION: The state of health-care disaster preparedness in Iran prior to the possible earthquakes is not well documented. This study identified the challenges of the Iranian health system before possible earthquakes in Tehran based on the World Health Organization (WHO) framework.

MATERIALS AND METHODS: In this qualitative study, in-depth and semi-structured interviews were conducted for 17 health experts and authorities, who were selected based on purposive sampling method. The questions were designed based on the proposed framework of the WHO in six areas including policies and planning, communication, collaboration and coordination, training, volunteers and the public, and surge capability. The data were analyzed by using framework analysis.

RESULTS: The main themes included weak communication infrastructures, inappropriate assessment of specialized training courses and lack of a clear scenario, integrated urban commanding, extra-sectorial coordination, and data banks for public volunteers.

CONCLUSION: Iran health-care disaster preparedness was tested by many earthquakes. This research showed that disaster preparedness in Iran faces several challenges.

Keywords:

Earthquake, health system, risk reduction, World Health Organization

Introduction

Iran has achieved considerable academic and administrative success in terms of emergency management and risk reduction in health sector, but many rooms for improvement are left.[1] Earthquakes of Bam (2003), Zarand (2005) and Lorestan (2006), Golestan floods (2001 and 2005), Cyclone Gonu (2007), and recurrent droughts were the largest disasters during the last 10 years, which health system could learn from and apply the lessons learned. Health systems play a major role in public health during disasters.[2] The health sector has a crucial position among different components involved in disaster management because health is the first and most important concern of people during striking the disasters.[3,4]

Considering the strategies and objectives determined in Sendai Framework for Disaster risk reduction (DRR) 2015–2030,[5] investment for having Community Disaster Resilience is regarded as one of the responsibilities for governments in disaster management and risk reduction.[2] Planning for preparedness is considered one of the useful ways for reducing the risk.[3] The approach is shifting from passive and hasty responses to systematic and comprehensive risk reduction.[6,7]

In the Iranian Ministry of Health and Medical Education (MOHME), the

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Center for Disaster Management and Medical Emergencies, affiliated to the Office of Vice-Chancellor for Treatment Affairs, is responsible for disaster management.[8] Further, the DRR and Management Unit, affiliated with the Office of Vice-Chancellor for Health, is another entity whose main responsibility is disaster risk reduction.[5] Although a large body of research has been conducted on preparedness issues in disaster situations, no research, to the best of our knowledge, has been conducted based on the six areas of World Health Organization (WHO) framework in Iran. Evidence of the effectiveness of health sector preparedness in disaster response that was done in Japan focus on response phases, and they recognize that wealthier countries are capable of higher levels of preparedness, and that their mitigation strategies also mean that their public health and health-care systems may not be stressed with as many casualties as would otherwise be the case when disaster strikes.[9] A grounded theory study in Iran that was done on disaster health-related challenges and requirements showed that health system needs strengthening intra- and intersectoral collaboration and coordination, information management system, community-based initiatives, and integration of disaster health management in primary health-care network. It also needs to focus on disaster risk reduction while enhancing response capacity. Investing on research would lead to quality decision-making in disaster health management.[1] Another grounded study was named disaster health-related challenges and requirements in Iran, which showed that public education and proper prevent planning help to bring about an effective response to providing health-care services during a disaster.[10] Looking disaster preparedness through the lens of hospitals in Japan showed that the majority of the respondent hospitals fulfill the functional preparedness, which is useful during the emergency period of a disaster, while the other three pillars – structural, nonstructural, and human resources – need to be strengthened.[11] Thus, the present study aimed to identify the challenges facing the Iranian health system related to earthquakes based on the six areas of WHO framework.

Materials and Methods

Content and framework analysis was used in this qualitative study. Purposive sampling was performed to select the participants.[12] Seventeen face-to-face interviews were conducted, with the participants selected from the Iranian Red Crescent Society as the representatives of nongovernmental organizations, the authorities of the secretariat of the workgroup of health and treatment in disasters affiliated with the MOHME, and experts and professors of medical universities as health system experts. The questions were designed based on the proposed framework of the six areas

suggested by the WHO, including policies and planning, communication, collaboration and coordination, training, volunteers and the public, and surge capability. Each interview lasts between 20 and 70 min. The average interview duration was 45 min. The interviews were continued until saturating the data. After conducting all the interviews and listening to the audio files, the interviews were transcribed carefully. The notes and key points extracted from each interview were summarized in a summary sheet. In addition, a unique code was given to the sheet and the audio file at the end of each interview and after completing the sheet. The questions were designed in such a way that the participants can focus on them in the interviews and obtain the intended data about the views of the experts. The practicality, usefulness, and clarify of the questions in the topic guide were checked through three pilot interviews, and the required modifications were made. The related documents which collecting and analyzing were examined and used for triangulation. The topic guide was prepared based on the study objectives according to the literature review. Then, the possible defects were resolved by using the views and instructions among the experts and professionals. Framework analysis was used to analyze data. Familiarization with the interview, developing a working analytical framework, indexing, charting, and interpreting the data were done.[13] To this aim, the stages were followed systematically and the analysis was conducted simultaneously with data collection. At first, the recorded data were implemented verbatim. Then, the texts were carefully studied several times to understand the data. The codes and themes were extracted along with data collection through open coding. Further, constant comparisons were conducted by a colleague to reach a consensus on the concepts at different levels of abstraction. In addition, the concepts were identified after checking the codes. Some of the participants' comments on the above six stages and the final product were received and applied to the data analysis. Finally, the data were manually analyzed without using software. In order to avoid bias in all stages, the researcher's pre-assumptions were not involved in the process of data analysis (bracketing). Lincoln and Cuba criteria were used to increase the validity and reliability.[14] Appropriate communication and adequate time allocation according to the participants' views led to an increase in the acceptability and reliability of the data. Selecting the participants with maximum diversity could increase the data credibility. In addition, the credibility method was used to review the handwriting by participants to resolve ambiguities in encodings. For this purpose, the researcher provided the participants with parts of the interviews and encodings to reach the same concepts in relation to participants' views. The Present study was approved by the Ethical Committee of Medical Sciences University of Iran. All interviews

were conducted in private in a pre-coordinated time and place. All recorded files were password protected, and the to-be-reported findings were anonymized. Research ethics was also considered in writing this article.

Results

The results are reported based on the WHO framework. Table 1 shows the number and position of the participants. Table 2 shows the themes and subthemes.

Planning and policies
Lack of a clear scenario, a comprehensive national plan for disasters, and a risk map

All participants except for MOHME experts stated that there was no contingency plan in the MOHME regarding what to do and who is responsible for doing and emphasized the vitality of vulnerability capacity assessment. There is only one national scenario in the MOHME, which is too general.

"Our plans are just limited to putting down words on paper. We develop plans only because we are required to. We should see what possible scenarios or risks threaten us and plan accordingly" (P3).

Table 1: Number and position of the participants

Position	n
International Institute of Earthquake Engineering and Seismology	2
Parliament	2
Tehran Disaster Management Organization (Municipality)	3
Iranian Red Crescent Society	4
Ministry of Health and Medical Education	3
Ministry of Interior	3
Total	17

Table 2: Identified themes and subthemes

Theme	Subtheme
Planning and policies	Lack of a clear scenario, a comprehensive national plan for disasters, and a risk map
	Lack of integrated urban commanding
	Short-term management courses
Communication	Lack of an appropriate communication system during disasters
	Weak communication infrastructures
Collaboration and coordination	Lack of coordination among organizations involved in the crisis
	Lack of coordination at the time of disaster
Training	Weakness in public training
	Inappropriate assessment of specialized training courses
Volunteers and the public	Lack of an up-to-date data bank for professional volunteers
	Lack of a data bank for public volunteers
	Source of community volunteers
Surge capability	Inappropriate management of resources
	Unclear mechanism of workforce deployment

Lack of integrated urban commanding
Some participants stated that lack of stewardship in planning and policymaking is regarded as a serious problem. One of the participants believed that the municipality is the best option for commanding when an earthquake strikes Tehran. Others believed that the activities of the National Disaster Management Office (NDMO), which is responsible for disaster as a whole, do not follow any scientific principles.

"The NDMO, which is supposed to be the major coordinator, lacks an incidence command center, and has limited authority" (P7).

Short-term management courses
Some participants mentioned that risk perception and the attitude of managers toward disasters play an important role in their decisions. One of the participants stated that the MOHME has given a low priority to disaster by being involved in numerous activities. On the other hand, the managers have a short political life, without any long-term plans.

Communication
Weak communication infrastructures
A number of participants blamed the economic sanctions imposed on Iran for weak communication infrastructures. They stated that Iran has only the first generation of wireless telecommunication due to the sanctions. Considering the complexity of the urban texture and the existence of most specialty and subspecialty hospitals in Tehran, the participants believed that all communication infrastructures can be destroyed during an earthquake in Tehran.

"The authorities in charge are constantly trying to improve the communication capabilities of the capital" (P8).

Lack of an appropriate communication system during disasters
In general, most participants emphasized the importance of communication systems which fail the least during disasters. The participants referred to the Internet, cellphones and social networks, satellite phones, and wireless communications, among which the Internet had the greatest and the satellite phones had the least vulnerability to failure during disasters.

"In terms of hardware, we should have a unique system only for disasters. Every country has a very efficient and exclusive system only for disasters. Our only strength is satellite phones although they do not belong to the country" (P8).

Collaboration and coordination
Lack of coordination at the time of disaster
Almost all the participants agreed that lack of collaboration and coordination is the most important

challenge in disaster management worldwide. Some of the participants stated that collaboration is more complex in Tehran. All the vital and important organizations were located in this city.

"The greatest problem in all disasters is lack of coordination and collaboration. Even countries with a national scenario, comprehensive plan, an effective preparedness, and advanced systems have problems in this respect" (P8).

Lack of coordination among organizations involved in the crisis

Coordination is not considered as the interference in the affairs related to other organizations, but is the mutual use of the equipment and facilities as synergy. Currently, the organizations do not make the best use of one another's facilities and work as isolated islands. Some experts believed that the MOHME has more problems with the extra sectorial relationships than intersectional coordination.

Training
Weakness in public training

Considering the compact urban structure of Tehran, lay people are the first to arrive at the scene. Therefore, they are regarded as the first group who need to go through first-aid training courses. They should know how to take shelter during an earthquake, cut life lines in the house, have a family preparedness plan and disaster scenario, practice them periodically, and have a disaster supply kit.

"Unfortunately, our people are not knowledgeable enough. For example, let's talk about a disaster supply kit; if you ask citizens as to what a supply kit is, most of them would not know" (P4).

Inappropriate assessment of specialized training courses

The specialized training courses of the health staff should be based on the four phases of disaster life cycle. Some participants believed in the classification of training courses as internal and external. In this regard, firefighting training for the emergency personnel or first-aid training for the firefighters are some examples of external training. Available training courses, especially in the form of seminars and workshops, are not properly assessed. Some participants mentioned a weak relationship between the university and industry.

Volunteers and the public
Source of community volunteers

Some participants focused on the high performance of the Iranian Red Crescent Society. Basij organization, under the Revolutionary Guard, was mentioned as the second source of community volunteers.

Lack of a data bank for public volunteers

Some of the participants agreed on the lack of an advanced data bank on volunteers. They stated that

there is no system for the management of volunteers. Currently, the same attitude can be adopted for recruiting volunteers.

"As for volunteers, crisis management meant taking action after occurring a disaster until 5–6 years ago. Volunteers management is currently following a similar trends" (P3).

Lack of an up-to-date data bank for professional volunteers

Some participants believed that the management of volunteers is very difficult, which requires the use of the intellectual power of all organizations such as the Parliament, Guardian Council, Red Crescent Society, and researchers. There is no up-to-date data bank in this regard, and professional volunteers cannot be dispatched easily when a disaster occurs unless coercive and hierarchical policies are reinforced.

"System of registration should be designed to require professional volunteers to comply by their commitment in terms of disasters. This should be done because many professional volunteers back out at times of disasters when their support is needed" (P5).

Surge capability
Inappropriate management of resources

Some participants stated that we have problems with the management of resources although there are no problems with the quantity of the resources due to our Islamic ideology and the generous donations made during disasters. Some participants believed that we have a few problems in terms of equipment. The shortcomings are related to organization, coordination, and education.

"We have plans which cannot become operational for different reasons like lack of information about what resources we need in the first hour, when and by whom the resources should be deployed, and above all, the security of the resources" (P11).

Unclear mechanism of workforce deployment

The recruitment and deployment of workforce is now more systematic than ever before. It is possible to recruit forces from universities located outside the capital. However, there is no appropriate transportation mechanism in this regard. The constant use of human resources on a single shift can cause exhaustion and medical errors. There is no incentive for deploying specialized workforce such as orthopedic surgeons. In addition, the participants mentioned that it is impossible to seek help from other organizations due to the complex nature of the medical profession.

"Because all our tasks are specialized, we cannot seek help from non-medical professionals. Even, a nurse may not function well

in emergency situations unless they have gained experience in a hospital emergency department" (P5).

Discussion

For the first issue planning and police, the current situation should be first analyzed based on accurate figures, statistics, and indexes during planning and policymaking. Then, according to the current status, experts who have experience in disasters should design an accurate, robust, and evidence-based scenario. In fact, this scenario is a roadmap for disasters in the country and defines the duties and responsibilities of each organization. Study of disaster preparedness showed that among hospitals in Los Angeles County, disaster preparedness and surge capacity appear to be limited by a failure to fully integrate interagency training and planning and a severely limited surge capacity, although there is generally a high level of availability of equipment and supplies.[15] The results of the study by Ardalan *et al*. (2012) indicated that a developed roadmap requires a dynamic process of evaluation and revision in order to ensure meeting Iran's health system goals.[16]

As for communication, our study showed that the infrastructures were weak due to the sanctions imposed on Iran. The issue of sanctions has been less frequently addressed in other studies too.[17] Some international studies suggest that communication is a key point in the success or failure of disaster management.[14] The outstanding performance of social networks has been more emphasized in information dissemination when the Internet is not down. Further, it is very effective to seek help from military communication systems.

For the collaboration and coordination, timely exchange of up-to-date information plays an important role in coordination. However, quarantining the information only causes more chaos, which is consistent with the results of another study.[18,19] The lessons learned suggest to implement community-focused emergency preparedness strategies.[20] The key factors that could improve the preparedness include training, increasing the perception of risk, changing the attitudes and behavior, developing a national strategic plan of the health system preparedness for policymakers, and implementing scenario-based exercises for executives.[21]

The question is whether the training courses provided for the health staff to enhance their preparedness can enhance their knowledge and skills for more effective reposes. Williams questioned the effectiveness of training courses at the preparedness phases.[22] Most of what is learned from disasters is related to previous disasters, it is not based on the evidence-based education.[18] In another study which focused on the knowledge and

attitude, people who had enough knowledge about earthquake preparedness were more prepared for the earthquake than those who were unaware of these issues.[23]

Volunteers can easily cause a collapse in the response system when a disaster strikes when they are not registered systematically, do not receive the necessary training, are not evaluated, and do not participate in field activities. The incapability of some volunteers was leading to some accidents in the 2010 Haiti earthquake.[24] International disaster reports show that 10%–70% of the responders were individuals who were not considered before the disaster during planning and policymaking.[25]

Surge capability is in place for effective response and recovery at emergency level. *Ad hoc* and an unplanned capacity planning in disaster events can result in further losses or exacerbate the disaster-stricken population. The results from one study showed that policymakers can improve the resource planning for cost-effectiveness of disaster risk reduction and capability self-assessment.[2]

The study is limited by its focus on strategic disaster preparedness, and the challenges presented might not reflect operational matters such the perception of clinicians about the role of emergency planners. One participant did not attend the interview and was interviewed by telephone. One of the limitations of this research was the poor co-operation of some organizations in presenting their people for interview.

Conclusion

Prevention should be the basis of planning. Infrastructure communications need to be strengthened, the order of the highest executive plays an important role in the collaboration and coordination. childhood training is the most important part of education. In the field of volunteering, organization plays the most important role. In surge capability ability to change the use of some products and utilizing the capacity of knowledge-based companies are the critical points. Finally, the health system must first collect lessons learned from these six areas, write and practice numerous exercises, and practice in the field, Finally the program in its covered organizations and centers is institutionalized, and then it is promoted through multilateral interaction and collaboration between organizations.

Practical suggestions

Considering the findings of this study, the following recommendation may contribute to the enhancement and improvement of the status of preparedness in Tehran: a road map based on the disaster management life cycle is developed and the roles of all organizations involved

in disaster management are clarified. An intersect oral data bank of volunteers is gathered and shared among all organizations involved in disaster management and updated regularly. It is necessary to establish a volunteer database among all the organizations involved in crisis management and update the bank. A risk map is developed considering all details, including the infrastructures, life lines, population, and urban structure.

Conflicts of interest
There are no conflicts of interest.

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