Health system preparedness challenges before earthquakes based on the WHO framework: a qualitative study in the Iranian context

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Abstract. Preparedness is a key component of disaster management. One of the main responsibilities of the health system is to improve preparedness to respond effectively to disasters. This study identified the challenges of the Iranian health system before possible earthquakes in Tehran based on the WHO framework. Materials and Methods. For this qualitative study, in-depth and semi-structured interviews with 17 health experts and authorities were conducted. Purposive sampling was performed to select the participants. The data were analyzed using framework analysis. Results. The main themes were weak communication infrastructures, inappropriate assessment of specialized training courses and lack of a clear scenario, integrated urban commanding, extra-sectoral coordination, and data banks for public volunteers. Conclusion. The Iranian Ministry of Health and Medical Education and other organizations that are responsible for disasters will not be able to play an effective role in managing disasters unless National Disaster Management Organization clarifies the roles they are to play when disasters strike through a roadmap at the national level.

Keywords. Earthquake, Preparedness, Health system, WHO framework, Tehran

Introduction

Natural disasters are part of human life [1] and are a severe rupture with high intensity, which require a high degree of intervention under extreme conditions[2]. An earthquake is one of the most lethal disasters that may occur in any country at any time with no predictable pattern [3]. Tens of thousands of people die in earthquakes every year and over 90% of the deaths occur in developing countries [4]. Iran is prone natural hazards[5] especially earthquake. According to the latest Global Assessment Report on Disaster Risk Reduction, Iran is one of the countries with high annual death rate due to earthquakes [6]. Tehran ,capital of Iran, is located on active faults and has a high potential for earthquakes [7]. The increased urban population of Tehran and its expansion indicate the need for a comprehensive crisis prevention, preparedness, and management plan [8].

Health systems play a major role in public health during disasters [9]. 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 when disasters strike [9,10]. Considering the strategies and objectives determined in Sendai
Framework for Disaster Risk Reduction 2015-2030,[12] investment in order to have Community Disaster Resilience [CDR] is one of the responsibilities of governments in disaster management and risk reduction[13]. Planning for preparedness is one of the ways of risk reduction [10]. The health systems approach to disasters is shifting from passive and hasty responses to systematic and comprehensive preparedness and risk reduction plan with an emphasis on pre-disaster phases [13,14].

In the Iranian Ministry of Health and Medical Education, the Center for Disaster Management and Medical Emergencies, affiliated to the Office of Vice-Chancellor for Treatment Affairs, is responsible for disaster management in health [16]. Moreover, the Disaster Risk Reduction and Management Unit, affiliated with the Office of Vice-Chancellor for Health is another entity whose main responsibility is disaster risk reduction [11].

However, literature is not scarce on preparedness issues in disaster situations, but no research has been conducted based on the six areas of WHO framework in the country. In this study, we identify the challenges facing the Iranian health system related earthquakes in Tehran based on the WHO framework six areas[17].

Materials and Methods

This qualitative study used in-depth and semi-structured interviews to identify the challenges facing the Iranian health system when earthquakes occur in Tehran. The data were collected through interviews with health experts and authorities. 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. These areas are also considered as the main pillars of preparedness at an international level[17]. Seventeen face-to-face interviews were conducted with the participants from the Iranian Red Crescent Society as the representatives of NGOs, 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. Purposive sampling was performed to select the participants[18]. A total of 200 minutes was recorded ranging from 16 to 50 minutes per interview with a mean duration of 30 minutes. Framework analysis was used for data analysis. It includes five steps, familiarization with the interview, developing a working analytical framework, indexing, charting, and interpreting the data[19]. In the familiarization step, preliminaries introduction was provided for more familiarization and immersion in data by listening to recorded interviews and reading scripts several times, and the key themes were listed. In the second step, a thematic framework of the key topics was prepared based on the WHO framework, which was used in the indexing stage for structuring all the data. In the charting step, a table was drawn for themes, and the data were transferred to each. In the interpretation step, the relationship among codes, subthemes, and themes was described. Two qualitative research experts verified the credibility of the data through the accurate and stepwise control of the research process. Interview texts were also sent to the participants with the initial codes extracted so as to receive their comments on their authenticity and to enhance the transferability of the extracted data.

Ethical Considerations

Informed consent was obtained through explaining the aim and process of the research both orally and in writing. Participants’ identities reminded anonymous. Participants had the right to withdraw from the study at any stage. The confidentially of the information was observed.
Results

The results are reported based on the WHO framework in the areas of planning and policies, communication, collaboration and coordination, training, volunteers and the public, and surge capability. The areas cover all aspects of preparedness[17].

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 as what to do and who should do it and emphasized the vitality of Vulnerability Capacity Assessment [VCA]. There is only one national scenario in the MOHME that is too general. The participants believed that focusing on one accurate scenario was better than focusing on several general and superficial ones. According to the interviews, there is no accurate scenario as to which fault would be activated, where and when the earthquake would occur or the status of lifelines. There is no local evidence-based roadmap to prepare for earthquakes in the MOHME; there are only some scattered scenarios derived from the Internet search or based on the experiences of other countries. According to some participants, there is a significant difference between scenarios on paper and in reality. One of the participants emphasized the importance of disaster experience in planning. Many people who are planning for mitigation strategies have no personal experience on earthquakes. Some participants felt a need for a change of paradigms and perspectives in planning and policymaking. The authorities take policymaking and planning for granted while there are complex tasks that require a comprehensive knowledge. Some participants believed that the quality of the plans and policies was not desirable and stated that they could not be executed because they are superficial. Some other participants asserted that there is no comprehensive prospective about the plans and policies and that everyone makes their own plans.

No-3 said, “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.”

Lack of integrated urban commanding: Some participants stated that lack of stewardship in planning and policy making was a serious problem. One of them believed that the Municipality was the best option for commanding when an earthquake strikes Tehran. Others believed that the activities of the National Disaster Management Organization which is responsible for disaster as a whole, do not follow any scientific principles. Some participants stated that this organization needs to develop an operational plan currently for disaster management to clarify the duties and responsibilities of other organizations.

No -7 said, “The National Disaster Management Organization, which is supposed to be the major coordinator, lacks an incidence command center, and has limited authority.”

Short-term management courses: Some participants mentioned that risk perception and the attitude of managers towards disasters play an important role in their decisions. One of the participants stated that being involved in numerous activities, the MOHME has given a low priority to disaster. On the other hand, the managers have a short political life and have no long-term plans. What they are looking for is to portray a good image in this short
period. They care only about the response phase. On the other hand, the graduated students have a tendency to choose the response phase as the subject of their theses.

**Lack of appropriate indexes:** One of the participants underlined the importance of having indexes for all aspects of resilience including, physical, organizational, economic, cultural and social indexes to know where we are and what we want to achieve.

No -10 said, “When an earthquake occurs, if we have no figures and statistics, we would not be able to make accurate judgment. We should turn everything into numbers and statistics in order to estimate the situation.”

**Communication:**

**Weak communication infrastructures:** A number of participants blamed the economic sanctions imposed on the country for weak communication infrastructures. They stated that Iran had 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 sub-specialty hospitals in Tehran, the participants believed that all communication infrastructures would be destroyed at the time of an earthquake in Tehran. Some participants asserted that Tehran enjoys a more sufficient telecommunication system as compared to other cities.

No -8 said, “The authorities in charge are constantly trying to improve the communication capabilities of the capital.”

One of the participants believed that Iran’s communication equipment and facilities are suitable for a developing country [20]. The communication system of Nepal was mentioned as one of the best information systems among developing countries.

**Lack of an appropriate communication system during disasters:** In general, most participants emphasized the importance of communication systems that fail the least during disasters. The participants mentioned the Internet, cell phones 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. Some participants stated that the only weak point of satellite phones was that they are not owned by the Iranian government.

No -8 said, “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 but we do not belong to the country.”

If the Internet is operational during a disaster, social networks will enhance sharing information. Social networks can also be used for pre-earthquake training. Seeking help from the capabilities of the Municipality and the military wireless systems is another strategy mentioned by the participants. However, it was stated that these facilities are not enough to cover the whole population of Tehran.

**Collaboration and coordination**

**Lack of coordination at the time of disaster:** Almost all the participants agreed that lack of collaboration and coordination were the most important challenges in disaster management worldwide. Some of the participants
mentioned that collaboration was more complex in Tehran. All the vital and important organizations are in this city. Some of participants believed that the materialization of even half of pre-determined plans would be ideal in the crisis response phase although about 10-12% of the plan could be achieved through this phase.

“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”, said No.-8.

Lack of coordination among organizations involved in the crisis: Coordination is not interference in the affairs of 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 inter sectional coordination. Some participants mentioned that everyone acted based on their own experience during a crisis in Tehran and that there are no documented guidelines for more cooperation in disasters.

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 the ones 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.

No.4 said, “Unfortunately our people are not knowallgeble 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.”

Considering vast varieties in our cultural, educational and cultural planning need to be developed for different districts of Tehran.

The media can play an important role in educating people about disasters. Some participants mentioned that the role of the MOHME and the Islamic Republic of Iran Broadcasting system in training the citizens is not clear. Some believed that television is the best media for building the culture of earthquake preparedness-most TV programs focus on trivial materials.

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 trainings courses as internal and external. In this regard, firefighting training for the emergency personnel or first aid training for fire fighters are examples of external training. Available training courses, especially in forms of seminars and workshops, are not properly assessed. Some participants mentioned, the weak relationship between the university and industry. Some graduated students’ theses are supervised by professors who have no experience in disasters, which yield unfounded findings.
Volunteers and the public

Source of community volunteers: Some participants mentioned the high performance of the Iranian Red Crescent Society. Basij organization, under the Revolutionary Guard, were 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 of attitude applies to recruit volunteers.

No.3 said, “As for volunteers, until 5-6 years ago, crisis management meant taking action after a disaster occurred. Volunteers management is currently following a similar trends.”

Lack of an up-to-date data bank for professional volunteers: Some participants believed that management of volunteers was very difficult. It requires the use of the intellectual power of all organizations such as the Parliament, Guardian Council, Red Crescent Society, and researchers. The safety of the participants and issues related to passive defense are important when a large group of professional volunteers is dispatched. 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.

No.5 said, “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. They make excuses such as suffering from hypertension, diabetes, etc.”

Surge capability

Inappropriate management of resources: Some participants stated that although there are no problems with the quantity of the resources due to our Islamic ideology and the generous donations made during disasters. However, we have problems with the management of resources. Some participants believed that we have a few problems in terms of equipment. The shortcomings relate to organization, coordination, and education. They mentioned a lack of appropriate plans in the MOHME, unnecessary bureaucracy and complicated administrative procedures, and the need for a rigorous surveillance over donations.

No.11 said, “We have plans that cannot become operational for different reasons like lack of information about what resources we need, 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. When there is a problem, the necessary supplies are loaded on trucks and dispatched to the stricken area. Trucks transporting supplies have been occasionally stopped and unloaded by security officials due to lack of necessary transportation documents.”

Unclear mechanism of manpower deployment: The recruitment and deployment of manpower is now more systematic than ever before. It is possible to recruit forces from universities located outside of the capital. However, there is no appropriate transportation mechanism in this regard. Constant use of human resources on a single shift can causes exhaustion and medical errors. There is no incentive for deploying specialized manpower like orthopedic surgeons. The participants also mentioned that it is impossible to seek help from other
organizations due to complex nature of the medical profession. Recruiting individuals with expertise is only possible from medical universities because people from other disciplines will not be able to render proper help to earthquake-stricken victims.

No.5 said, “Because all our tasks are specialized, we cannot seek help from non-medical professionals. Even, a nurse may not function well in emergencies unless they have gained experience in a hospital emergency department.”

Discussion

The results showed that when planning and policymaking, the current situation should be first analyzed based on accurate figures, statistics, and indexes. Then, according to the current status, experts who have experience in disasters should design an accurate, robust, and evidence-based scenario. This scenario should be tested in several stages and its shortcomings should be addressed. This scenario is in fact a roadmap for disasters in the country and defines the duties and responsibilities of each organization. So the recommendation is to develop a roadmap based on the disaster management life cycle and clarify the roles of all organizations involved in disaster management seem necessary. Furthermore, developing a risk map considering all details, including the infrastructures, life lines, population, and urban structure would be also needed. The results of a study by Ardalan et al showed that a developed roadmap requires a dynamic process of evaluation and revision to ensure meeting Iran’s health system goals [21].

As for communication, most participants agreed that the infrastructures were weak due to sanctions imposed on the country. The issue of sanctions has been less frequently addressed in other studies[22]. International studies suggest that communication is a key point in the success or failure of disaster management [23]. There was much emphasis on the outstanding performance of social networks in information dissemination when the Internet is not down. It is also very effective to seek help from military communication systems. As suggested by previous studies[24], developing a protocol among interested organizations before a disaster helps to define a roadmap for disasters. Parallel operations and efforts are the major problems resulting from lack of coordination. Timely exchange of up-to-date information plays an important role in coordination. Quarantining the information by organizations only causes more chaos. The results of a study by Zhang et al confirm this point [25].

The question is whether the training courses provided for the health staff to enhance their preparedness increased their knowledge and skills for more effective responses. A study by Williams questioned the effectiveness of training courses at the preparedness phases when we need to operationalize training course at the response phases [26]. Most of what is learned from disasters is through previous disasters rather than evidence-based education[27].

If the volunteers are not registered systematically, do not receive the necessary training, are not tested, and do not participate in field activities, they can easily cause a collapse in the response system when a disaster strikes. Incapability of some volunteers caused some accidents in the 2010 Haiti earthquake [28]. International disaster reports suggest that 10-70% of the responders in disasters were individuals who were not taken into account before the disaster when plans and policies were made [29]. In addition, final recommendation is to develop an inter-sectoral data bank on volunteers shared among all organizations involved in disaster management and to
update it regularly. All the participants reiterated the mismanagement of resources and called for prompt and timely distribution of the resources according to the needs of the disaster-stricken population. This was also confirmed in a study conducted following the 1994 Northridge earthquake in California[30].

Conclusion

In conclusion, the Iranian health system faces two major challenges: Direct challenges related to the Iranian Ministry of Health and Medical Education and indirect challenges that are related to its subsidiaries, including health centers and hospitals. As for the MOHME, considering the fact that the Center for Disaster Management and Medical Emergencies is responsible for the management of disasters in the country, there is a need for modifying the organizational chart of the Ministry to increase the power and authority of this Center. As for the affiliated organizations, all organizations such as hospitals should enhance and improve their structural, non-structural, functional, cultural, social, and managerial resiliency as a symbol of hope during disasters. It should be mentioned that although this study was performed in Iran, its results can reflect the situation in other developing countries, especially those in the Middle East.

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References


