



Prioritizing Pre-hospital Emergency Risks and Preparedness According to the Health Response Program in Rasht, Iran in 2019

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Abstract

Background: Hazards have always been considered a threat to human life and preparedness to deal with risks for pre-hospital emergency as the first line of care and treatment is highly significant. Pre-hospital emergency (clinical) deals with different natural and man-made hazards which cause various harms. Preservation of disaster preparedness is one of the pre-hospital emergency concerns. In this regard.

Objectives: The present study aimed to determine the priority of hazards and design preparedness programs based on health response.

Methods: The present study was based on a descriptive-analytical study that was conducted in Rasht, Iran in 2019. The method used in this study was a combination of quantitative and qualitative methods. In a qualitative method, the major threats and potential hazards of pre-hospital emergency were identified by reviewing the texts and searching for relevant articles. Afterward, its effectiveness and the significance of its risk or threat were evaluated using a researcher-made checklist. In total, 19 crisis liaisons from the organizations involved in crisis management in Rasht were questioned, 18 of whom responded to the checklist.

Results: The results obtained from the opinions of the experts showed that the risk of earthquakes (88.8%) and seasonal flood (83.3%), among all the risks investigated, have a higher priority than traffic accidents (77.7%) and heavy snowfall (72.2%) in the society. The pre-hospital emergency is closely related to many various risks, among which the earthquake risk was chosen as the priority by the community of experts participating in this research. For the emergency of the earthquake, preparedness plans were produced based on the response plan of the health sector and the additional comments of the expert community.

Conclusion: Identification of high-priority risks and design of appropriate response plans will help those in charge to face and prepare in time and reduce damages.

Keywords: Disasters, Emergencies, Emergency medical services, Earthquakes, Natural disaster, Risk management

1. Background

Pre-hospital emergency, as the first line of care and treatment in dealing with out-of-hospital emergency patients, is of considerable significance in the healthcare system (1). Moreover, it is one of the most stressful areas of the health system (2) since pre-hospital workers face stressful environments (3). A pre-hospital emergency must provide all life-saving treatment measures outside of the hospital (4). Iran is among the countries where natural and unnatural accidents and emergencies occur frequently; therefore, preparedness and planning for dealing with environmental disasters are highly essential (5).

Nowadays, the occurrence of natural hazards is inevitable due to increasing urbanization rates, especially in developing countries. However, experience has shown that such accidents can significantly minimize the caused damages and losses

by identification and evaluation of vulnerable areas, as well as in advance planning and operational measures (6). Natural hazards, such as floods, earthquakes, and droughts in geographical areas, especially in rural areas often lead to many irreparable damages (7).

Iran is one of the ten most disaster-prone countries in the world, as it is located on the seismic belt of the Alps-Himalayas (8). It has the sixth rank in the world in this regard due to its geographical location and climatic diversity (9). Reviewing the statistics from earthquakes during the last 100 years indicated that about 21 earthquakes at a magnitude of above 5 have been recorded over the past century, killing a total of 600,000 people (10).

Earthquake, as one of the most destructive types of natural hazards, has large and unpredictable forms. Therefore, its consequences cannot be avoided (11). Nevertheless, its harmful effects can be

minimized with proper management (12). The first step in crisis management is to evaluate the awareness, attitude, and performance of people and analyze the factors which affect their educational needs and demands (13). Despite the need for a single appropriate management strategy for different situations, crisis management also needs to recognize various situations and dimensions of a crisis, as well as environmental and purposeful requirements to be able to cope with that crisis (14). Implementation of various strategies, such as improving structural changes in responsible organizations, building trust, reinforcing facilities, planning, assigning tasks and inter-institutional coordination, improving earthquake information and communication management system, storing first aid and training, as well as acculturation can reduce financial and human losses at the time of crisis (15).

Today, optimal crisis management is one of the essential strategies to deal with crises due to the increase of different social and environmental crises. Land preparation is the logical arrangement of the elements in the land, including the population, facilities, and services, in the best possible condition to regulate the interaction between human factors and environmental factors. Land preparation aims to achieve justice and progress in all regions and provide equitable benefits for all people from the wealth and facilities of the government.

Many environmental, social, economic, and other crises are rooted in the lack of attention by decision-makers to this highly vital issue (16). Natural crises threaten human lives and properties every year. Therefore, planning for disaster preparedness is highly necessary (17). Pre-hospital emergency, which is called 115 in Iran, faces different types of risks.

2. Objectives

Due to the significance of hazards and planning for the area of medical emergencies, the present study aimed to prioritize the hazards of pre-hospital emergencies.

3. Methods

This study is descriptive, analytical, and quantitative. First, by reviewing the texts and opinions of experts, a large number of risks related to pre-hospital emergency rooms were obtained. Afterward, according to these risks, a checklist was prepared for the prioritization and categorization of the risks, and 18 organizations that were directly related to city crisis management were selected. The prepared checklist was given to crisis members of 18 organizations active in city crisis management.

In total, 18 experts participated in this study, who were from organizations in the field of urban crisis management and organizations that were somehow

related to this field in Rasht. The checklist was completed by the subjects and collected. To collect the required data, the available literature in the field of natural hazards was reviewed. Afterward, to find activists related to the crisis, the crisis management department of the province was referred and the list of organizations that are related to the urban crisis was obtained. Finally, 18 organizations were selected from active centers.

Subsequently, a researcher-made checklist was prepared under the supervision of the professors and given to the crisis activists of the 18 above-mentioned organizations. Afterward, information was collected and urban hazards were prioritized. It should be noted that the validity of the researcher-made checklist was confirmed by the expert community of the crisis department.

Rasht City, one of the metropolises of Iran and the capital of Gilan province, is located in the north of Iran. This city is the most populous city in northern Iran among the three provinces along the Caspian Sea and also the biggest and most populous city of Gilak people in the world. Based on the 2016 census, the population of Rasht is 679,995 people. Moreover, the floating population of Rasht is more than one million people. It is also noteworthy that the population of this city during the holidays is more than two million people.

The list of related organizations includes Gilan University of Medical Sciences, Gilan Province Medical Emergency and Accident Management Center, Gilan Red Crescent, Gilan Province Fire Department, Gilan Province Meteorological Organization, Rasht Municipality, Housing and Urban Development Foundation, State TV and Radio Organization, Road and Urban Development Department, Deputy of Crisis, Agricultural Jihad Organization, Blood Transfusion Organization, Rasht Poursina Hospital, 17 Shahrivar Hospital, Al-Zahra Hospital, Rasht General Defense Office and Velayat Hospital.

First, the complete list of current hazards was provided for the experts (the recent risks have been obtained by reviewing the texts and the opinions of the experts of the studied society) and officials of partner organizations in crisis management in Rasht. Afterward, a checklist for classification and prioritization of hazards was prepared with the guidance of the professors of the research team and provided for the experts who were the crisis liaisons of organizations involved in the crisis in Rasht (18 experts from organizations involved in the crisis of Rasht). According to the information obtained from the checklist, the high-priority hazards were elicited from the checklist using descriptive statistics.

According to the objectives of the research, emergency preparedness plans are produced with the highest priority according to the health response plan of the field of health in disasters. Preparedness programs for dealing with and preparing for risks based on the emergency response operations plan

(EOP) of the health sector are explained below in several stages.

First stage: The preparedness programs of the health emergency response operation program were elicited from the books and texts available in the Ministry of Health and Medical Education.

Second stage: Preparedness programs based on EOP were prepared for an emergency with a high priority with the views and recommendations of the experts.

4. Results

Based on the demographic results obtained from the samples, 76% of the participants were male, 55.4% had master’s and doctorate degrees, and the rest had bachelor’s degrees with 5-12 years of work experience. It should be mentioned that 77.7% of the participants of this research worked in the field of urban management and they were working in the same organization.

The first priority was the urgency of the earthquake with a frequency of 16 and a risk probability of 88.8%. The second priority was the seasonal flood with a frequency of 15 and a risk probability of 83.3%. The rest of the list included

traffic accidents with a frequency of 14 and a probability of occurrence of 77.7%, heavy snowfall with a frequency of 13 and a probability of occurrence of 72.2%, and falls with a frequency of 12 and a probability of occurrence of 66.6%. In addition, drowning, ethnic conflict, industrial accidents, building destruction, and accidents during projects were considered lower priorities. According to the obtained results (Table 1), the probability of occurrence of the prioritized hazard (earthquake) with a frequency of 8 was 44.4%. According to the results obtained from table 2 Frequency distribution of the significance of prioritized hazard (earthquake) with frequency 8 was 44.4%.

The most significant hazards we face after reviewing and commenting on crisis liaisons in organizations involved in crisis management as the community of experts are shown in Figure 1.

Table 3 shows that Earthquake hazard with a valid percentage of 88.8% and a frequency of 16 was selected as the first priority by the experts. Probability of the occurrence of the most prioritized hazard (earthquake) with a frequency of 8 was 44.4% (Table 1). Frequency distribution of the significance of prioritized hazard (earthquake) with a frequency of 8 was 44.4% (Table 2).

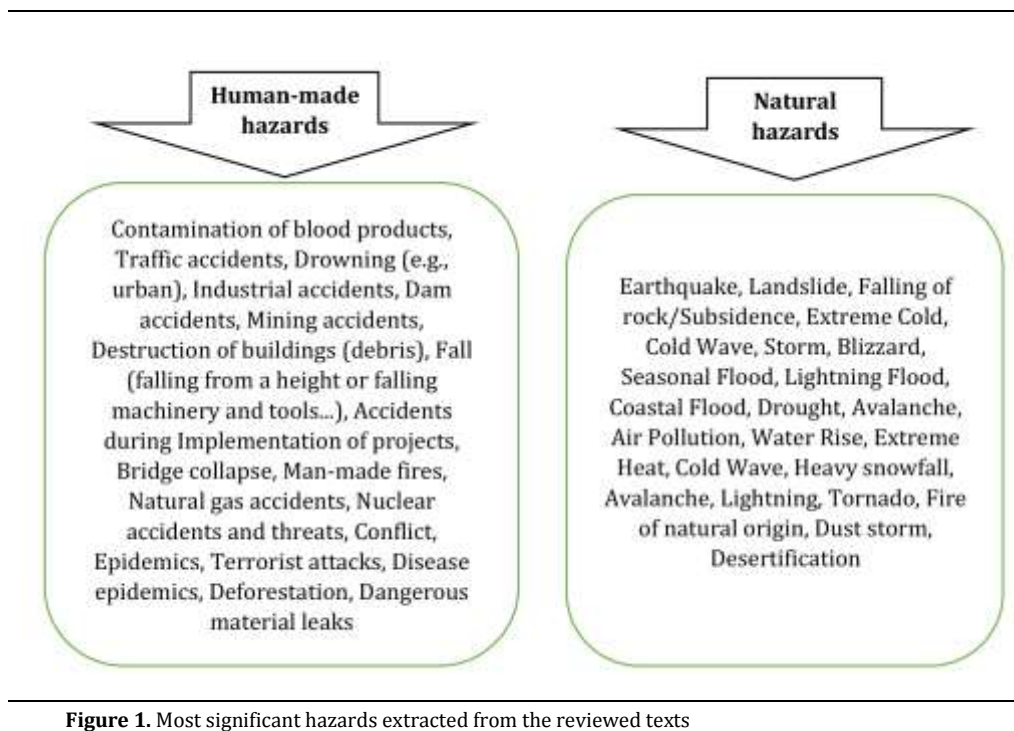


Figure 1. Most significant hazards extracted from the reviewed texts

Table 1. Frequency distribution of the probability of the occurrence of the prioritized hazard (earthquake)

Probability	Frequency	Valid percentage
High	8	44.4
Very high	5	27.7
Average	3	16.6
Low	2	11.1
Very low	0	0
Total	18	100.0

Table 2. Frequency distribution of the significance of the prioritized hazard (earthquake)

Significance	Frequency	Valid percentage
Very high	8	44.4
High	5	27.7
Average	2	11.1
Low	0	0
Very low	3	16.6
Total	18	100.0

Table 3. Frequency distribution of hazard prioritization

Priorities	Frequency	Mean
1- Earthquake	16	88.8
2- Seasonal flood	15	83.3
3- Traffic accidents	14	77.7
4- Heavy snowfall	13	72.2
5- Fall	12	66.6
6- Drowning	11	61.1
7- Ethnic conflict	11	61.1
8- Industrial accidents	10	55.5
9- Building destruction	10	55.5
10- Accidents during the implementation of projects	10	55.5

By reviewing the literature and referring to the information collected from the opinions of the participant community, it was found that the risk of an earthquake with the highest incidence rate is at the top of the medical emergency priorities. Since the first priority chosen by the community of crisis experts in Rasht city was the earthquake, preparedness plans for the earthquake were produced.

The national plan for the response of the health system to accidents and disasters contains the management as well as the special and specialized functions of the health system, which are necessary for preparation and response. Emergency preparedness plans are written based on the health response plan. The emergency response program based on an emergency response operations plan (EOP) about the earthquake is as follows (Table 4):

- Earthquake preparedness programs were first prepared for all hazards based on the "Health Response Program" book and afterward, the earthquake preparedness plans were written as they had a higher priority, compared to the other hazards according to the experts.
- An early warning should be given.
- An appropriate place should be set for accident command, triage areas, gathering of the injured, and storage of reserved force. The forces in the areas should be distributed correctly.

- A continuous relationship with the message center should be preserved.
- The performance of the operations unit should be monitored and evaluated and a report should be submitted to the accident commander on an ongoing basis.
- Continuous communication with hazard monitoring centers should be maintained (estimating the required equipment and human resources).
- The performance of pre-hospital operations teams at the scene should be monitored.
- Proper distribution of casualties among the existing hospitals and their capacity should be monitored.
- Immediate performance reports should be sent to upstream levels.
- All actions should be documented.
- The exact geographical location, time, type, and extent of the accident should be determined first.
- Rapid assessment should be conducted in the nearest operations unit by the first ambulance.
- A motor ambulance, ambulance, or emergency helicopter should be sent from the nearest operation unit to the scene.
- Event information should be estimated through an interview with the accident commander.
- Continuous guidance should be given to ambulances and other operational teams.
- A report should be prepared and recorded on the actions taken by the expeditionary forces.

Table 4. Main purpose of the pre-hospital services program in disasters

1- Reliable, timely, and logical awareness, monitoring the information of the accident through the Crisis Operations Management Center	6- Provision of life-saving services through limited resources
2- Coordination in the supply of equipment and human resources	7- Correct transfer of the injured to the determined medical centers
3- Provision of effective and appropriate responses through timely management of organizations	8- Usage of the accident command system
4- Establishment of active relationship with all levels of accident command	9- Announcement of the final report to the command unit
5- Participation and coordination of other involved organizations	10- Coordination in returning to the normal state

5. Discussion

According to various reviews, no research was found that was completely similar to this research; therefore, emphasis was placed on articles that are similar in several cases of their results or methods, or emphasis on the risks discussed.

There have been several prominent hazards in Gilan province which have posed a serious threat to the lives and property of people during recent years. The present field study indicated the high priority of earthquakes, snowfall, and traffic accidents. In fact, the occurrence of any of these events imposes heavy costs and requires a timely response from relief organizations, such as pre-hospital emergencies, which needs redesign and preparation of measures to deal with such accidents (17).

Seasonal rains at 83.3% (Table 1) are among the second-priority of hazards according to crisis management experts, given that climate change and its effects on human societies are expanding. The experiences of crisis liaisons during recent years regarding snowfall and torrential rains can be the reason for selecting flood events and heavy snowfall as a high priority. Urban crisis management should establish some measures to prevent hazards and design risk preparedness programs. Moreover, it should pre-design and prepare a Center for Management of Medical Accidents and Emergencies to implement pre-hospital measures in reducing the possible injuries of people due to the occurrence of hazards (18). The results of the present study indicated that the risk of earthquakes and seasonal floods is one of the top priorities in terms of crisis liaisons of organizations involved in crisis management in Rasht. These results are consistent with those of the studies conducted by Avvenuti (19), about the earthquake hazard, and Seyed Mojtaba Husseini (20).

In addition, traffic accidents and torrential rains are among the high priorities of urban hazards that need to be followed up and studied by provincial officials due to the location of Rasht in terms of torrential rains and heavy snowfall during the previous years. The results of a study performed by MOE Fujita (21) showed that seismic urgency was the third most common hazard after major floods and epidemics which is different from the findings of the present research in terms of prioritization.

In a study conducted by Waugh WL (22), a drought at 0.9% was recognized as the most common risk by the people while storm and wind at 0.6% were the second priority of risk for the people. Therefore, their results were inconsistent with those of the present research. Furthermore, in a study conducted by Hanoon (23), Iraqi land use change was selected as the most significant biological hazard, which was inconsistent with the findings of the

present research. Furthermore, building demolition and industrial accidents were given a lower priority, compared to earthquake risk (24).

5.1. Limitations

The lack of integrated and organized management in the governorate for organizing crisis liaisons, lack of availability of crisis liaisons in most departments if necessary, lack of similar investigations, lack of priority in crisis management in most departments and organizations, lack of a clear and specific plan and lack of proper understanding of the crisis conditions and the involved risks, the lack of sufficient cooperation between the crisis liaisons of the departments to complete the research checklist, which is due to the lack of emphasis on the issue of crisis in the departments and organizations were among the limitations of this study.

5.2. Suggestions

- It is recommended to select all effective organizations in urban crisis management, the liaison, and crisis expert of the department and send the names of all these individuals with an active telephone number to the provincial crisis management center.
- It is suggested to delegate the responsibilities of crisis management to departments and also the duties of crisis liaisons of departments or organizations to the individuals whose field of study is at least related to crisis and emergencies or attend crisis management preparation classes.
- It is advised that crisis and risk management preparation classes be held for all integrated crisis liaisons on a monthly basis.
- It is recommended for the general manager of governorate crisis to manage preparedness maneuvers in the departments and organizations as they are necessary to maintain the required level of preparedness on a permanent basis.
- It is suggested to arrange prepared and organized programs for several hazards which have a higher priority in advance and provide them for organizations.
- It is recommended to select individuals as the crisis liaison for at least five years; hence, the desired organization is not disrupted in terms of organizing and planning for the crisis.
- It is advised to arrange public preparedness programs against disasters and hazards in coordination with the State TV and Radio Organization by preparing and designing videos, films, and animations for the public.

6. Conclusion

Based on the results of this study and the

situation of Iran in terms of disasters, and the significance of pre-hospital emergencies in controlling and managing emergencies, there is a need to plan and implement practical measures. These measures, which are highly significant to improve their preparedness to help emergency patients, include health management training for disasters and emergencies, estimation of the significant and necessary resources required, change of the structure of human resources supply and facilitation of services delivered to victims during accidents and disasters, rapid maintenance and repair of required equipment, timely triage, and rehabilitation of pre-hospital emergencies.

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Footnotes

Conflicts of Interest: The authors declare that they have no conflicts of interest.

Authors' Contributions: RA, AJZ, ESN: concept and study design. AJZ: data collection. RA, MP, AJZ, MZ: analysis. AJZ, RA: writing the article. RA, MZ, AD, PA, ESN: critical revision of the article. HF: statistical analysis. RA, AJZ, MP, MZ: final approval of the article

Ethical Approval: The project was found to be in accordance to the ethical principles and the national norms and standards for conducting medical research in Iran, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran. Ethical Code: IR.SSU.SPH.REC.1399.036

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