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Investigating the Preparedness of Iranian Families in the Face of Disasters

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Original Research

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Abstract

Objective: Preparedness in different sections of a society can improve the reactions of individuals at the time of disasters and strengthen the cooperation and coordination between people and organizations. The present study aimed to investigate the preparedness of households in Ardabil Province of Iran in the face of disasters in 2020.

Methods: This descriptive, cross-sectional study was conducted in Ardabil Province in Iran in 2020. The target population included the households living in Ardabil Province. The study was conducted on 10 502 participants. The data were collected using a questionnaire completed by trained questioners by referring to the participants' houses. It should be noted that the questionnaires were completed by one of the household parents. The questionnaire contained 15 questions related to taking and not taking disaster preparedness measures at specific times. EXCEL 2016 (Microsoft, Redmond, WA) and SPSS 23 software (IBM Corp, Armonk, NY) were used for data analysis.

Results: Considering the score of 1 for each action, the mean score of households' disaster preparedness in Ardabil Province was 31.09%. The preparedness level of 51.4%, 42.31%, and 6.29% of the households in the province against disasters was at low, moderate, and good levels, respectively. Among the items of preparedness in the face of disasters, the highest value was related to the familiarity of family members with the initial warnings of significant hazards (5162 households, 49.15%) followed by planning for coping with disasters (43.12%) and assessing the non-structural vulnerability (38.93%). Furthermore, the results showed that the level of household preparedness was higher in the center of the province compared to other cities.

Conclusion: Evaluating the level of preparedness of different societies in the face of disasters can be very useful in identifying the challenges to improve preparedness and, consequently, achieving sustainable development. This assessment can be considered a resource for provincial policy-making and planning to achieve the priorities set out in the Sendai framework. However, such assessments should be performed periodically, for example, annually, to reflect the effectiveness of the interventional measures in improving preparedness. Considering the low level of households' preparedness in the present study, there is a gap between what people know and what they do, and comprehensive studies are needed on various factors that encourage people to take preparedness measures.

Disaster is a sudden event that seriously disrupts the functioning of a society and causes human, financial, and environmental damages beyond the control of the affected society.[1] Over the last decade, the severity and frequency of natural and manmade disasters have increased significantly around the world. Disasters such as hurricanes, earthquakes, floods, outbreaks of infectious diseases, and leaks of nuclear materials and oil annually disrupt the economy of countries and lead to environmental degradation and emergence of mental illnesses.[2–6] Evidence has indicated that individuals and capitals in different countries are increasingly exposed to disasters, leading to new risks and an increase in damages caused by disasters, such a way that they have had severe economic, social, health, cultural, and environmental impacts in the short, medium, and long term, especially at the local and society levels.[7]

During the 10 years between 2009 and 2018, an average of 343 natural disasters occurred annually in the world. In 2019, 396 natural disasters occurred, which resulted in the death of more than 11 755 people and loss of more than 130 billion dollars, and 95 million people were affected around the world. It should be noted that more than 10% of the people affected by these disasters lived in Iran. This country, with 10 million affected people, has been ranked third after India and the Republic of Korea.[8] Iran is one of the most disaster-prone countries in the world. According to statistics, 31 out of the 40 types of natural disasters occur in Iran. The existence of such natural disasters in Iran has made it one of the top 10 countries in the world in terms of disasters.[9] Iran accounts for only 1% of the world's population, while it accounts for 6% of the world's disaster losses.[10] The 120-year (1900–2020) statistics of Iran have demonstrated earthquake as the most devastating and damaging natural disaster in Iran. Additionally, statistics on the occurrence of technological disasters between 2000 and 2019 showed that Iran had

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the eighth rank in the world with 136 disasters.[11] These statistics revealed the high risk of disasters in Iran.

Having information about an unusual and harmful phenomenon can enhance the potential and ability of humans to escape from that phenomenon and even prevent the occurrence of that harmful phenomenon, in some cases.[7] Since an organization's capacity to cope with and manage disasters alone is usually limited and most disasters have local, regional, and sometimes national and international effects, affected people and societies alone are not able to cope with such disasters, and the management of these crises requires the cooperation, coordination, and empathy of organizations and people. In this context, affected societies are the most important and the first group of respondents. In most programs designed to reduce the risk of disasters, the focus is on the local society. In fact, preparing different groups of the society not only improves the reactions of people in the face of disasters but also strengthens coordination and cooperation between people and organizations.

According to Prior, the nature of hazards is a social and managerial rather than a natural catastrophe that some societies have learned to cope with, while others are still unable to do so.[12] According to Muttarak's study, one of the main causes of the catastrophic deaths and damages caused by the Indian Ocean tsunami in December 2004 compared to the March 2011 Tohoku earthquake in Japan was the lack of knowledge and unpreparedness among the population.[13] In the only study conducted in this field in Iran, the preparedness of Iranian families was equal to 8.5%, which increased to 9.3% after the intervention and implementation of the public training program in 2015. Nevertheless, not continuing training programs will lead to a decline in people's preparedness. In a previous study conducted in Tehran in 2014, a joint project between the Red Crescent Society and the International Federation of Red Cross and Red Crescent Societies was implemented to reduce the risk in Tehran as a pilot project for public education. According to the findings, 93.3% of the respondents stated that their awareness of the necessary measures before, during, and after disasters was at average and below average levels. They also maintained that their measures and efforts to learn the issues related to the measures before, during, and after disasters were at a low level.[14] Ardabil, as a province in northwestern Iran, has experienced various disasters, including floods and earthquakes. Therefore, the present study aims to investigate the level of preparedness of households in Ardabil Province of Iran in the face of disasters in 2020.

Methods

This cross-sectional, descriptive-analytical study was conducted in Ardabil Province in Iran in 2020.

Study Area

Ardabil Province is located in the north of the Iranian plateau with an area of 17 950 square kilometers (1.1% of Iran's total area). The province is geographically located at 37.45 to 39.42 north latitude and 47.30 to 48.55 east longitude of the Greenwich meridian in northwestern Iran. The province has 10 cities. According to the 2016 census, the population of Ardabil Province is 1 270 000 people. Based on the General Directorate of Crisis Management of the province, floods, earthquakes, hurricanes, hail, severe cold, widespread fires, and landslides are the most common disasters in this province. According to a report by the National Statistics Center from the 2011 census, there were about 174 000 non-durable house units in Ardabil Province, which accounted for 55% of the total buildings in the province. In an earthquake that occurred in March 1996 with a magnitude of 5.6 at an approximate distance of 18 km from the west of Ardabil, more than 76 000 people were affected, 12 500 buildings were completely destroyed, and about 1300 people were killed. These statistics show the high vulnerability of Ardabil Province to various disasters, emphasizing the need to pay more attention to household preparedness in the face of disasters.

Sampling

The target population of this study included the households living in Ardabil Province. Sampling was done in all the 10 cities of Ardabil Province. The number of people considered in each city was calculated based on the ratio of its population to the total population of the province. In total, 10 502 samples were selected randomly. The samples were determined based on the municipality divisions of each city. In case the number of samples in the selected district was less than the determined value, sampling would continue in other districts until reaching the specified number of samples for each city. In case the number of samples in the district was more than the determined value, the samples would be selected by using systematic random sampling. Informed consents were obtained from all individual participants included in the study.

Data Collection Instruments

The data collection instrument was a questionnaire completed by trained questioners after visiting the participants' houses. The people completing the questionnaire were one of the household parents. If none of the parents was present at home, the researcher would refer to their house again. The questionnaire contained 15 questions related to taking and not taking disaster preparedness measures at specific times. The questionnaire was developed by the Ministry of Health of the Islamic Republic of Iran under the title of Household Disaster Preparedness Index (HDPI). The validity and reliability of the questionnaire were assessed by Ardalan et al. and Najafi et al.; accordingly, the Cronbach's alpha for preparedness and awareness questions was estimated to be 0.78.[15,16]

Preparatory measures included holding a planning meeting to cope with disasters among family members, preparing important hazard risk maps, familiarizing with disaster and disaster warnings, assessing the structural and non-structural safety of housing, taking measures to reduce non-structural vulnerabilities, presence of an emergency kit and fire extinguishers, communication plan between family members after disasters, preparing an emergency evacuation plan, planning to help vulnerable groups among family members such as elderly people, training a family member about first aids (a program for collaboration of family members to participate in neighborhood-based disaster management programs), and practicing emergency preparedness among family members. Scores 1 and 0 were recorded for taking and not taking the measures, respectively. The same weight was considered for the questions. Finally, by summing the scores of the actions, the households' preparedness levels were calculated on a 100% scale.

Data Analysis

To analyze the data, descriptive statistical methods were used in EXCEL 2016 (Microsoft, Redmond, WA) and SPSS 23 software (IBM Corp, Armonk, NY).

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Table 1. Number and percentage of households' disaster preparedness activities carried out over the past year

Activity	n = 10 502	Percentage (%)
Holding a family meeting for disaster planning	4529	43.1
Drawing a household disaster risk map	3145	29.9
Assessing the structural safety of the house	3051	29.05
Taking structural safety measures	3056	29.1
Assessing the non-structural safety of the house (eg, furnishing, equipment, and electrical and mechanical fixtures)	4220	40.18
Taking non-structural safety measures	4089	38.93
Preparing an emergency kit	3137	29.87
Having a disaster communication plan	2818	26.83
Having a disaster evacuation plan	3427	32.63
Planning for vulnerable members of the family	3417	32.53
Being aware of early warnings for hydroclimatic hazards (eg, flooding)	5162	49.15
Having a fire extinguisher in the house	1984	18.89
At least one of the household members being trained on the first aids	2692	25.63
Contributing to neighborhood disaster planning	2490	23.71
Carrying out a disaster exercise	2543	24.21

Results

The preparedness of 10 502 households in the face of disasters in Ardabil Province was measured. The number and percentage of performance of each preparedness measure over the past year have been presented in Table 1. Considering the score of 1 for each action, the average preparedness of households in Ardabil Province in the face of disasters was 31.09%. Among the items of preparedness in the face of disasters, the highest value was related to the familiarity of family members with the initial warnings of significant hazards (5162 households, 49.15%) followed by planning for coping with disasters (43.12%) and assessing the non-structural vulnerability (38.93%).

The percentage of taking each of the preparedness items separately by the households has been presented in Figure 1. Accordingly, 11.85% of the households (n = 1244) had not done any of the preparedness measures during the past year and 1072 households (10.21%) had only done 1 preparedness action. The level of household preparedness in the face of disasters was considered based on the number of measures taken. Accordingly, the levels of household preparedness with 0–4, 5–10, and 11–15 measures were considered low, moderate, and good, respectively. According to the preparedness scale, the preparedness levels of 51.4%, 42.31%, and 6.29% of the households in the face of disasters were low, moderate, and good, respectively. In other words, 5398 households had taken less than 4 preparedness measures and only 661 households had taken more than 11 preparedness measures during the past year.

The results of comparing the province cites indicated that the level of household preparedness was higher in the center of the province than in other cities (Figure 2).

Discussion

According to the results, the preparedness of households in the face of disasters in Ardabil Province was 31.09%. In other words, approximately 31 out of every 100 households in the province took the preparedness measures. This level of preparedness was higher than the average level of preparedness in Iran in 2015 (9.3%). The high preparedness level of households in Ardabil Province in the face of disasters compared to the national average in 2015 could be attributed to the high vulnerability of Ardabil Province compared to other provinces of Iran. Additionally, increasing and improving the Internet access, expanding virtual education, and promoting community-based activities such as holding school preparation maneuvers during the past 5 years could be effective in increasing the preparedness of families in the face of disasters in Ardabil Province.

Although the highest percentage of household preparedness in Ardabil Province was related to familiarity with the initial warnings of significant hazards (49.15%), this item was estimated at 83% in Turkey.[17] Moreover, planning to cope with disasters gained the second highest percentage of preparedness (43.12%), but it was estimated at 56% in a study conducted in the United States.[18] These findings suggested that although the percentages of some preparedness measures were high in Ardabil Province, they were low compared to other countries. Hence, all items have to be taken into account for planning to improve the preparedness of households in the province. However, the level of household preparedness in the face of disasters was low in many countries like Turkey and China. In Australia also, only one-fifth of households were prepared for a possible emergency. In the United States, 12.3% of households took preparatory measures. In Japan, too, only 30% of households stored emergency supplies. In some high-risk cities, however, household preparedness for disasters seemed to be higher than the national average. For example, the findings of a study conducted in 4 cities in China demonstrated that the number of households with a good level of preparedness was 2.5 folds higher in Sichuan than in Beijing.[19]

Most studies have emphasized the necessity to pay attention to individual and household preparedness in the face of disasters. Increasing households' preparedness in the face of disasters and participation in disaster planning is one of the strategies to achieve sustainable development.[15] According to World Health Organization's (WHO) recommendations, citizens should be empowered in terms of self-dependency, first aids, and other similar procedures to respond quickly to major incidents or disasters.[20] Generally, each society is composed of groups of stakeholders exposed to similar risks. These groups can be classified into 3 groups of officials, experts, and people. Studies have disclosed that the role of people, as the most important and largest group of stakeholders, has often been neglected in planning for preparedness in the face of disasters.[21] Households' preparedness for emergencies depends on various and complex factors. Such factors as having sufficient knowledge, having sufficient income and resources, previous experience of disasters, awareness of risk, risk perception, type of disaster, people's vulnerability level, and cost-effectiveness of preparedness measures have been mentioned as the main factors involved in disaster preparedness.[22] According to the research carried out by Musacchio, the lack of risk perception in the society, state development programs, curricula, and media priorities was the key issue in disaster risk reduction.[23] Although some studies have referred to the level of knowledge as one of the factors involved in disaster preparedness, just having sufficient knowledge cannot guarantee the performance of preparedness measures.[15] Based on the findings of Muttarak's study, participating in disaster preparedness exercises and programs increased the likelihood of taking preparedness measures. Furthermore, people with higher

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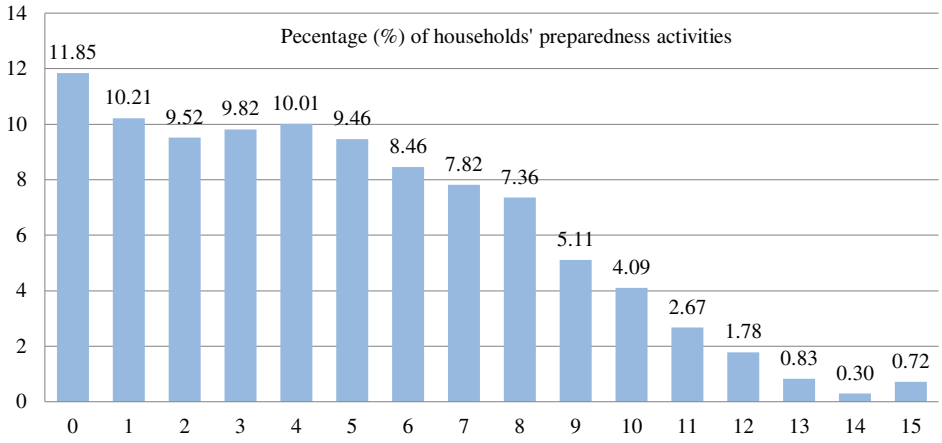

Figure 1. Percentage of the households' disaster preparedness activities.

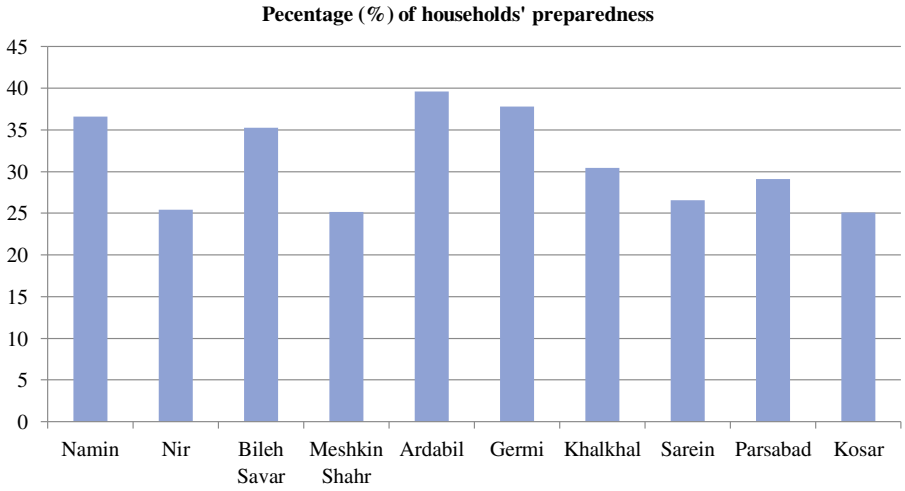

Figure 2. Percentage (%) of households' preparedness in each city.

education levels had better learning and processing skills of abstract thinking.[13]

Although some studies have referred to the previous experience of disasters as one of the factors involved in preparedness, some other studies have not reported this to be a significant factor. In Muttarak's study, training of family members along with the availability of information resources were reported as the main factors that increased disaster preparedness among the people with no previous experience. In fact, training could increase individuals' awareness of the risk while they had not experienced any natural disasters. However, training programs cannot lead to preparedness and change in attitudes and behaviors without taking individuals' knowledge levels, attitudes, performances, preferences, and needs into consideration. In other words, informing alone does not change people's attitudes and behaviors, and it should be used to encourage people to take preventive behaviors by using appropriate methods while increasing their understanding of the risks.[24]

The present study had some limitations. First, disaster preparedness of households could have different aspects, while only 15 items were considered in this investigation. Besides, some items might have higher weights in assessing household preparedness for a particular disaster with a high risk in the area. However, households' preparedness was evaluated using the all-hazard approach in this study. Therefore, all items were considered to have the same weight. As another study limitation, one parent was asked as the representative of the family, while other family members might have had different opinions about some items.

Conclusion

The concept of preparedness is perceived in different ways, making it difficult to assess and compare. Thus, a comprehensive study is recommended to be conducted to identify the indicators and items of preparedness to make data comparable in different countries.

Evaluating the preparedness of different societies in the face of disasters can be very useful in identifying the challenges to improve preparedness and, consequently, achieving sustainable development. This assessment can be considered a resource for provincial policy-making and planning to achieve the priorities set out in the Sendai framework. However, such assessments should be performed periodically, for example, annually, to reflect the effectiveness of interventions in improving preparedness. Considering the households' low level of preparedness in the face of disasters in the current study, there seems to be a gap between what people know and what they do, and comprehensive studies are required to be

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conducted on various factors that encourage people to take preparedness measures.

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