Household disaster preparedness in the Islamic Republic of Iran: 2015 estimation

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Abstract

Background: Households are the most fundamental unit of society and they need to be prepared for disasters.

Aims: This study assessed the 2015 national estimation of disaster preparedness among Iranian households.

Methods: Using a multi-stage cluster sampling, this study was performed on 2986 households in the catchment area of 54 public health departments in all 30 provinces of the Islamic Republic of Iran. The data collection tool was Household Disaster Preparedness Index (HDPI), which included 15 disaster preparedness measures. SPSS 22.0 was used for statistical analysis.

Results: The mean score of Household Disaster Preparedness (HDP) was estimated at 9.3 out of 100 (95% CI: 8.3–10.3). The multivariate analysis revealed slightly higher preparedness among rural households than urban households ($P < 0.001$). Higher level of education was positively associated with a higher preparedness score ($P < 0.001$).

Conclusion: In line with first priority for action of the Sendai Framework for Disaster Risk Reduction, the current study provided an overall picture of HDP in the Islamic Republic of Iran. This estimation can be used as a baseline value for policy-making, planning, and evaluation of disaster public awareness in the country.

Keywords: Disaster, preparedness, community, household, Iran

Introduction

The Islamic Republic of Iran is a disaster prone country where the risk of natural disasters is 8 out of 10 in terms of mortality (*1*). Each year, on average, natural disasters kill about 2900 people and affect 1.5 people (*2*). Earthquake, flood, drought and storms are the main natural disasters that affect the lives and livelihood of Iranians. To mitigate the risk of disasters, the country needs a national disaster preparedness programme that enable all units of the community including individuals, households, organizations and societies to respond and recover effectively when disasters strike (*3*).

Lessons learned from Iranian disasters and those learned from other countries serve to highlight the need for individual responsibility in disaster preparedness (*3*). Local people are the first who need to take protective actions when a disaster occurs. In addition, before arrival of any professional response team, local people serve as the first responders to help their own families and neighbours, especially those with special needs and disabilities (*4*). Furthermore, studies have emphasized on citizen involvement as a key component in the natural hazard risk reduction (*5*), and showed that improving the local preparedness will be effective only if people at risk know how to react appropriately (*6*).

During the past decade, the Islamic Republic of Iran has invested considerable efforts to develop policies and infrastructure for disaster preparedness, including establishment of the National Disaster Management Organization and strengthening of relief organizations (*7*). Nevertheless, the preparedness of local people has remained a genuine concern. To estimate the burden of this concern and to monitor its status overtime, a measurement system should be implemented beginning from the development of a baseline figure.

In this article we present the results of a quantitative estimation on disaster preparedness among Iranian households, as we argue this is the most basic and fundamental unit of society.

Methods

This survey was performed in December 2015 covering the catchment area of 54 Public Health Departments (PHD) in all 30 provinces of the Islamic Republic of Iran. The goal was to assess the preparedness of Iranian households for disasters. Responses were received from 53 out of 54 (98.2%) PHDs. The study was administered by the staff of Disaster Risk Management Offices at PHDs. The staff underwent a two-day training workshop and were provided with a training manual for reference. The study protocol was piloted on four clusters (28 households) in one PHD. The study protocol was then revised according to the pilot phase. Study variables were household disaster preparedness, region (urban *versus* rural), house ownership status (owner *versus* rental), and education of head of household (illiterate, elementary, middle, high school, university).

Data collection was done using a questionnaire including 15 disaster preparedness measures. Households were asked if they had taken any of the measures over the past year of study. The questionnaire, entitled "Household Disaster Preparedness Index (HDPI)", was developed and validated for face and content validity by experts in health systems and disaster management. The questionnaire content and face validities were assessed and the Cronbach alpha for the awareness and readiness questions was estimated at 0.78.

Interviewers were health staff of corresponding PHDs who were trained in the questionnaire, study protocol, and interview skills. Each study interview lasted 20 minutes. Most often, the interviewee was the head of the household, unless he or she was not available, in which case another informed person older than 18 years of age was interviewed. If subjects were not at home at the time of the attempted interview, up to two additional visits were made.

The household was the survey unit and was defined as a group of individuals living together under one roof. A multi-stage cluster sampling was applied for the purpose of this study. At the first stage, two districts were randomly selected in each PHD. Accordingly, two urban and two rural areas were randomly selected in each district. Finally, in each selected study area, two random clusters of seven households were chosen using registries of households available at the corresponding primary health centre. The result was 384 clusters including 2986 households.

A score of 1 was given for each activity undertaken. Unsure answers were coded as 0 by default. Equal weight was given to each question. A raw score was tallied for preparedness questions by a simple sum of all scores. Finally, preparedness raw scores were normalized on a 100-point scale. In the case of missing or outlier data, field collection teams were sent back for clarification.

A complex sampling design was applied to consider the strata and clusters. To describe the articles, mean and standard deviation of preparedness score were calculated along with the 95% CI. Independent t-test and ANOVA were applied for comparison of HDPI between and among the study subgroups. Linear regression models were applied to assess the adjusted effects of background variables on disaster preparedness. $P < 0.05$ was considered statistically significant. The software for statistical analysis was SPSS 22.0.

Ethical considerations
This study was reviewed by the Disaster Risk Management Office of the Iranian Ministry of Health and Medical Education and considered exempt as no intervention was carried out and no sensitive data was collected.

Results
In this national survey, 2986 households (50% urban and 50% rural) were assessed for disaster preparedness; 2545 households (85.2%) were the owner of the houses they were living in, while 441 households (14.8%) were living in a rental house. The education level of the head of household was as follows: 482 (16.1%) illiterate, 748 (25.1%) elementary schools, 617 (20.7%) middle school, 712 (23.8%) high school, and 427 (14.3%) university. The mean score of household disaster preparedness was estimated at 9.3 out of 100 (95% CI: 8.3–10.3). Table 1 presents the frequency of preparedness measures reported by the households over past year of study.

The mean preparedness score was higher among rural households than the urban households, i.e., 9.5 (9.04) versus 9.1 (9.01) ($P = 0.02$). A slightly higher preparedness score was observed among households that were the owners of the property they lived in compared to those who were living in a rental house, i.e., 9.4 (9.02) versus 9.3 (9.04) ($P < 0.001$). A higher level of education was positively associated with a higher preparedness score, as the mean score was 8.1 (8.31), 9.1 (9.14), 9.2 (8.23), 9.3 (9.33), 10.3 (9.52) among illiterate, elementary, middle, high school and university, respectively ($P < 0.001$). The multivariate analysis also revealed independent significant effects of all background variables on preparedness score ($P < 0.001$) (Table 2).

Discussion

This article reveals that the household disaster preparedness is low in the Islamic Republic of Iran, i.e., approximately 10 out of 100 households, on average. Since this is the first national estimation, it is difficult to assess trends that have occurred over the past years. Nevertheless, we speculate that the HDP has improved in the country during the past decade. This can relate to improved public awareness facilitated by media and community-based initiatives such as annual school drills.

Local people are always on the frontline in a response to disasters. They are the first respondents before arrival of any professional team to the affected area. Furthermore, preparedness of local people reduces the impacts of disasters and associated risks of mortality and injuries. This can happen by having an emergency kit ready; conducting regular drills; assisting vulnerable people; and having a communications plan, etc. Lessons learned from disasters around the world highlight the need for individual responsibility and local coordination in response to and recovery from disasters (*3*). In this line of work, scholarly literature has emphasized the importance of the household and individual preparedness in response to natural disasters (*8,9*). Enhanced awareness of people and involvement of citizens in disaster planning is also a strategy that must be incorporated into public values to improve the sustainability of decisions (*10*). This is why national governments initiate plans to enhance disaster preparedness at community levels (*3*).

A household, by definition, is a place where a group of individuals live under the same roof. As an important component of the community preparedness for disasters, this article has focused on households. The logic behind this was that a household, mostly shaped by members of a family, is the basic unit of society, and is a place where the members support each other and learn from one another. Each individual interacts with other family members and can both affect others and/or be affected. These characteristics can be leveraged for community disaster preparedness.

Because of the frequent devastating disasters in the Islamic Republic of Iran and the coverage by public media, we can expect the Iranian community to be well-sensitized and informed on the risks of disasters, especially earthquake and flood. However, the low preparedness, measured by taking the practical steps, shows there remains a gap between what people feel and what they do (*11*). This requires further studies to investigate factors that contribute to this gap.

Preparedness of households for emergency situations depends on factors that are complex and multifaceted (*12*). Having even sufficient knowledge of how to prepare for emergencies does not guarantee that people would take self-protection measures (*13*). The positive association between past disaster experience and preparedness of households has been found in several studies (*14,15*); however, Shaw et al. (*16*) argue that past disaster experience is not the prime factor to enhance awareness and believe that school education can provide useful information as a knowledge base for earthquakes.

Risk perception is another key factor that determines if people take preparedness measures (*9,14*). It also affects how people think about sharing the responsibility of themselves with governmental organizations (*9*). Sutton and Tierney (*3*) suggest some households may not be able to prepare disasters because of lack of resources. This vulnerability can be associated with income, education, ethnicity, age, and linguistic isolation. Edwards (*17*) suggested that those most likely engaged in self-protective behaviour from earthquakes are those who situated in structurally advantageous locations. Two studies in Tehran suggest that in order to promote disaster preparedness behaviour, one must focus on people with low socioeconomic backgrounds (*11,15*). Factors such as income influence access to safe housing, insurance and other resources required for safety measures such as preparation of emergency kits (*3,18*). Therefore, limitations on household resources should be taken into consideration when advocating for safety measures (*17*).

There is also a possibility that people overestimate their preparedness (*8,19*). A study in Queensland, Australia, found that while 2 out of every 3 households believed they were prepared or very prepared for a natural disaster, their responses to more detailed questions on preparedness suggested otherwise (*19*). In our study, the participants expressed low basic preparedness.

Following the 2003 Bam earthquake, the Islamic Republic of Iran has invested considerably in public awareness through national media. Iranian television and radio channels have produced programmes such as TV reports, expert interviews and animations and have presented them on special occasions, including the anniversary of the Bam earthquake and the National Day of Disaster Reduction. Moreover, an annual earthquake drill is held at schools by the Ministry of Education and the International Institute of Earthquake Engineering and Seismology (*20,21*). In addition, a neighbourhood disaster preparedness programme has also been developed by the Tehran Disaster Prevention and Management Organization, and expanded to other cities (*22*).

According to the country's National Disaster Management Organization, the Iranian Red Crescent society (IRCS) is the lead agency for the Working Group of Disaster Public Awareness. While IRCS has done many activities, including training volunteers and conducting community drills, disaster management public awareness is a difficult task to be managed entirely by one agency. The Working Group has to leverage the capacities of all governmental bodies and civil societies to create better preparedness.

The Iranian public health system, led by the Ministry of Health and Medical Education (MoHME), is a key and trusted partner in community disaster preparedness (23,24). It not only has taken an initiative to measure the HDP, but has also leveraged the capacity of the primary healthcare system to educate households in collaboration with community health volunteers. As the result of this initiative, over 500 000 households underwent training by the end of 2015 (25). The programme has continued in 2016 and is now well integrated into the primary healthcare system in the Islamic Republic of Iran. Under this programme, each household should have a HDPI form in their respective health centre files. Quantifying the HDP, presented in this article, was a supporting evidence and driving force behind the creation of this programme.

Conclusion

In line with the first priority for action of the Sendai Framework for Disaster Risk Reduction (SFDRR), i.e., understanding the risk (26), the current study provides an overall picture of HDP in the Islamic Republic of Iran. Although the finding of our study has supported the first priority for action in SFDRR, it can indirectly influence the other three priorities of strengthening disaster risk governance, investing in disaster risk reduction for resilience and enhancing disaster preparedness for effective response and to "Build Back Better" in recovery. For example, the estimation of HDP can help communities with identifying and filling their preparedness gap and enhancing disaster preparedness for effective response as well as effective investment in disaster risk reduction for resilience. This estimation can be used as a baseline value for policy-making, planning, and evaluation of disaster public awareness which can have considerable effects on strengthening disaster risk governance in the country. HDP estimations should be repeated on regular basis, preferably annually, to monitor the effectiveness of HDP interventional programmes. Further research is needed to explore different aspects of HDP including political sensitivities and legal frameworks to support community level preparedness, risk analysis, evacuation plan and community safety, health sector community preparedness and environmental health.

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Table 1. Disaster preparedness activities as reported by Iranian households in 2015 (n=2986)

Activity	N	%
Family meeting for disaster planning over past year	532	17.8
Drawing a household disaster risk map	107	3.6
Assessing structural safety of the household	146	4.9
Taking structural safety measures	93	3.1
Assessing non-structural safety of the household	167	5.6
Taking non-structural safety measures	125	4.2
Preparing an emergency kit	257	8.6
Having a disaster communication plan	230	7.7
Having a disaster evacuation plan	346	11.6
Planning for vulnerable member of the family	433	14.5
Being aware of early warning for hydroclimatic hazards	496	16.6
Having a fire extinguisher in the house	376	12.6
Being trained for medical first aid by at least one of the household member	427	14.3
Contribution in neighborhood disaster planning	194	6.5
Carrying out a disaster exercise over past year	206	6.9

Table 2. Comparison of mean score of household disaster preparedness among study subgroups

Group	Mean	SD	Bivariate analysis	Multivariate analysis		
			P Value[*]	B	t	*P* Value[*]
Area						
Urban	9.1	9.01	0.02	0.079	3.021	<0.001
Rural	9.5	9.04				
House ownership						
Owner	9.4	9.02	<0.001	0.001	0.072	<0.001
Rental	9.3	9.04				
Education of family head						
Illiterate	8.1	8.31	<0.001	0.002	6.047	<0.001
Elementary	9.1	9.14				
Middle	9.2	8.23				
High school	9.3	9.33				
University	10.3	9.52				

*P values are calculated based on the complex sampling design.