



Assessment of Social Vulnerability of Older Adults in Zahedan to Natural Disasters in 2023

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ABSTRACT

Background: It is important to take older adults into consideration during natural disasters, because these disasters are increasing in number and severity and the population of the elderly is growing as well. The present study aims to assess the social vulnerability of older people in Zahedan to natural disasters in 2023.

Materials and Method : This cross-sectional, descriptive-analytical research was conducted in Zahedan in 2023. All male and female residents of Zahedan aged 60 or older were selected as the study population, and the participants were selected via random cluster sampling. For data collection, after obtaining the necessary permits, the researchers had to attend public places such as parks, entertainment centers, and the participants' residence. Considering the inclusion and exclusion criteria, the researchers explained the aims and objectives of the study to the respondents and asked for their participation. Then, they were asked to fill out the questionnaire of social vulnerability. The reliability and validity of this questionnaire were confirmed, and the collected data were analyzed in SPSS version 26.

Results : A total of 150 older residents of Zahedan took part in the study. Their mean age was 72.4±9.5 (ranging from 60 to 91 years old). Assessing the obtained scores revealed that the criteria of physical ability, sense of safety, and awareness of danger were "relatively unfavorable" in the participants.

On the other hand, the criteria of social skills and mental abilities were assessed “unfavorable”. The total score of social vulnerability of these individuals was 74.48 ± 6.2 . The results of correlation analysis demonstrated that the social vulnerability of older adults in Zahedan has a significant relationship with age, gender, education, and occupational status ($P < 0.001$).

Conclusion :According to the findings of the present research, the elderly population of Zahedan have a high degree of social vulnerability to natural disasters. This is a warning sign for health care managers and crisis management authorities. Further planning and provision of necessary education to the public are required in order to manage the current situation and reduce social vulnerability of older adults.

Keywords: *Older adults, social vulnerability, accidents and natural disasters, health*

INTRODUCTION

Advancements in medical sciences and health care in the past hundred years have led to the relative increase in life expectancy and the population of older adults. This has raised a number of concerns in relation to health care and wellbeing in societies, and it is a great public health challenge in the present century. The reason is that as people become older, they gradually lose some of their physiological, psychological, and social functions and need more care (1). According to the definition presented by the United Nations Organization, people aged 60 or more are classified as older persons. According to the reports of the World Health Organization, this group formed 12% of all the population in 2015 and it will reach 22% in 2050 (2). Currently, in Iran, like many other developing countries, the population is aging as a result of considerable decline of fertility rates and increased life expectancy. Individuals aged above 60 years made up over 9.3% of all the population in 2016 (3). It is also predicted that this number will reach 21.7% by 2050 (4). Consequently, after South Korea, Iran ranks second in terms of the growing percentage of older adults (5). This is a warning both to the people in charge and the general public.

Older adults are one of the most vulnerable social groups in case a natural disaster occurs, and they are most at risk of being exposed to its negative effects. Natural disasters can be classified into three categories depending on their origin: terrestrial disasters such as earthquakes, volcanic eruptions, and tsunamis; climatological disasters such as floods, hurricanes, droughts, extreme

heat waves or cold waves, and landslides; and biological disasters such as widespread epidemic diseases (6,7). Global statistics show that Iran has the tenth rank worldwide in terms of natural disasters and calamities (8). These natural disasters cause high numbers of human casualties and damage across the globe, leaving considerable negative physical and psychological impacts on the victims and survivors. These injuries and tensions can have long-term effects on the lives of the people. They specially affect older individuals. Reports exhibit that such calamities affect about 26 million older people every year. About 1330 people lost their life due to Hurricane Katrina and most of them were older adults. Meanwhile, the United Nations has no exclusive unit dedicated to provision of support for this group, and only a small number of all the existing non-state international organizations deal with older people (9,10).

Compared with people of other age groups in the society, older adults are physically and mentally less flexible and, therefore, more vulnerable to the aftermath of incidents and calamities (11). Factors such as motor problems, loss of consciousness, cognitive limitations, hygiene, health conditions, socioeconomic limitations, and weak functional capacity can make it challenging for this group to take proper safety and protective measures prior to the occurrence of disasters and calamities. These conditions can also make it difficult for these individuals to cope with the outcomes of incidents and improve the situation (12).

Previous studies have demonstrated that older individuals are highly at risk of being affected by

the negative impacts of disasters and calamities (13, 14). Under these circumstances, psychological problems such as depression, memory loss, and forgetfulness appear in the older individuals. These problems can be easily neglected since the pattern of symptoms that appear in older adults is not similar to that in younger people. On the other hand, the escalating tension and stress in families and the society after a natural disaster causes the needs of older adults to be ignored, which in turn imposes further negative outcomes for this group (15). The findings of a study in Iran show that shortage of financial resources and overwhelmed health care facilities put older individuals at higher risk of being harmed after the occurrence of a natural disaster (16). Another study maintains that an individual's status in life has considerable impact on their social vulnerability in case disasters strike. In this regard, older individuals are more susceptible to possible damage since they need more care (17). Therefore, natural disasters inevitably entail many social consequences. In some cases, social vulnerability is more common than psychological issues, since the range and scope of the resulting social harms is significant enough to make the impact last for a long time after the event. Consequently, it is expected that the social aspects of natural disasters be investigated more closely (18). Major criteria that influence social vulnerability of older adults can be classified into underlying indicators such as physical, mental, and social issues; exacerbating indicators such as poverty and financial issues; and coping mechanisms of individuals. Social vulnerability indicates the amount of social harm such as social isolation, social adjustment, social alienation, anomie, identity crisis, and social deviance among various population groups that may impact the components and elements of a society after a disaster or calamity occurs (19).

The increasing number and severity of natural disasters on the one hand, and the growing population of older adults on the other hand make it crucial to pay special attention to people of this age group after such events. Sistan and Baluchestan Province has a population of 2 million and 800 thousand people, 3% of whom are older adults (20). Zahedan, the capital of this

province, is prone to natural disasters due to the excessive expansion of the city, population growth, deteriorated urban fabrics in many parts of the city, use of materials with poor durability, existence of residential areas in slums and outskirts, informal settlements, lack of utilities and infrastructure, absence of urban services, environmental hazards such as exposure to fine dust, as well as being located in a fault zone and in a flood-prone area (21). On the other hand, due to social vulnerability of older adults and considerable research gap on this subject, we aimed to address the existing issues in this context so that it would be a small step in understanding the detrimental aspects of social vulnerability of older people. The objective is to assess the social vulnerability of older adults in Zahedan in case of natural disasters in 2023.

MATERIAL AND METHODS

Type, time, and location of the study

This cross-sectional, descriptive-analytical research was conducted in Zahedan in 2023.

Study population, sampling method, and sample size calculation

All residents (male and female) of Zahedan who were 60 years of age or more were selected as the population, and a number of these people were chosen for this research through random cluster sampling.

In the quantitative section of this research, we used Cochran formula for the unlimited community to calculate sample size. The size of sample units was thus obtained as 142 individuals, at a 95% confidence interval, 90% statistical power, and a precision level of 3. Considering the likelihood of sample attrition, we increased the sample size by 10% and it was therefore calculated as 150 individuals.

In order to apply random cluster sampling, firstly, Zahedan was divided into 5 parts: the northern part, the southern part, the eastern part, the western part, and the central part. Afterward, 2 areas of each part were randomly selected and, according to the inclusion and exclusion criteria, 51 elderly individuals from each area were randomly chosen for the purpose of this research.

Inclusion and exclusion criteria

The inclusion criteria consist of 60 years of age or older, residing in Zahedan, and willingness to participate in the study. And the exclusion criteria included returning incomplete questionnaire, history of underlying disorders, history of taking certain medication and death of the participant.

Data collection method

For the purpose of data collection, after obtaining the necessary permits, we attended public places such as parks, entertainment centers, and the participants' residence. Considering the inclusion and exclusion criteria, we explained the aims and objectives of the study to the older individuals and invited them to the study. The participants were reassured that their personal information would remain confidential at all times throughout the study. Then, their informed oral and written consent was obtained for voluntary participation in the research. The participants were then asked to complete the questionnaire of social vulnerability. The participants' age, gender, level of education, nationality, and marital status were also recorded. In case of older adults who were illiterate or incapable of completing the questionnaire, we read the questions to them out loud and accordingly completed the questionnaire on their behalf.

Data collection tools

In order to collect the necessary data, we used the questionnaire of "social vulnerability of older adults in case of natural disasters". Daddoust designed this questionnaire and confirmed its validity and reliability (24).

This questionnaire covers indicators such as physical and mental abilities, social skills, sense of security and safety, and awareness of danger. The lowest obtainable score in this questionnaire is 24 and the highest is 120. Higher scores indicate that the older individual is more socially vulnerable.

Scores within the range of 24 to 55 are considered "low", scores within the range of 56 to 86 are considered "high", and scores within the range of 87 to 120 are considered "very high". The higher

the score, the more the individual is socially vulnerable.

The indicator of physical ability includes 5 items that examine the individual's capability to fulfill daily activities. The obtainable score for this indicator ranges from 5 (minimum score) to 25 (maximum score). Scores within the range of 5 to 10 are considered "unfavorable", scores within the range of 10 to 15 are considered "relatively favorable", and scores within the range of 15 to 25 are considered "favorable" for this criterion.

The indicator of mental ability includes 3 items and higher scores indicate lower mental capabilities in this part of the questionnaire. Participants' scores range from a minimum of 3 to a maximum of 15. Scores within the range of 3 to 7 are considered "unfavorable", scores within the range of 8 to 11 are considered "relatively favorable", and scores within the range of 12 to 15 are considered "favorable" for this criterion.

The indicator of social skills includes 10 items that examine social factors that impact the person's vulnerability. Higher scores indicate better social skills in this part of the questionnaire. The obtainable score for this indicator ranges from 10 (minimum score) to 50 (maximum score). Scores within the range of 10 to 23 are considered "unfavorable", scores within the range of 24 to 36 are considered "relatively favorable", and scores within the range of 37 to 50 are considered "favorable" for this criterion.

The indicator related to the sense of safety and security includes 3 items. Higher scores indicate lower sense of safety. Participants' scores range from a minimum of 3 to a maximum of 15. Scores within the range of 3 to 7 are considered "unfavorable", scores within the range of 8 to 11 are considered "relatively favorable", and scores within the range of 12 to 15 are considered "favorable" for this criterion.

The indicator related to awareness of danger includes 3 items, and its higher scores indicate more awareness of danger. Participants' scores range from a minimum of 5 to a maximum of 15. Scores within the range of 3 to 7 are considered "unfavorable", scores within the range of 8 to 11 are considered "relatively favorable", and scores

within the range of 12 to 15 are considered “favorable” for this criterion.

The validity and reliability of this questionnaire has been confirmed by Daddoust (Cronbach's alpha= 95, ICC=95). In the present research, the validity of this questionnaire was confirmed once more and our results report its reliability as 85.0 according to the Cronbach's alpha method.

Statistical analysis of data

After collecting the necessary data, we used SPSS version 26 to analyze them. To describe the data, we used mean, standard deviation, range, frequency, and percentage. Correlation coefficient was used to consider the type of responses to the questions and the results of data normality. A p-value of less than 0.05 was considered statistically significant.

Ethical considerations

This research has been approved by the Ethics Committee of Zahedan University of Medical Sciences (IR.ZAUMS.REC.1401.265). After the objectives and advantages of participating in the study were explained, we obtained an oral and

written consent from all older adults who expressed their willingness to enter this study. Maintaining the confidentiality of all the recorded information was among other measures that we took with respect to ethical considerations. Throughout the course of this research no costs or expenses were imposed on the participants. In all stages of the study, we adhered to the principles of the Helsinki Convention and respected the civil liberties of the participants. They were also ensured about the voluntary nature of their participation in this study and the fact that they could withdraw at any stage.

RESULTS

The mean age of 150 older residents of Zahedan who were studied in the present research was 72.4±9.5 (with the youngest being 60 and the oldest being 91 years old). They all completed the questionnaire and turned it in. Also, 64% of the participants were male; 98% were of Iranian nationality; 58% were illiterate; 22% had elementary education; and 84% were married (Table 1).

TABLE 1: Demographic Data of 150 Older Residents of Zahedan

Variable		Frequency	Percentage
Gender	Female	54	36
	Male	96	64
Marital status	Single	6	4
	Married	126	84
	Widow(er)	18	12
Education	Illiterate	87	58
	Elementary education	33	22
	Secondary education	15	10
	High school diploma	9	6
	Associate degree or higher	6	4
Nationality	Iranian	147	98
	Non-Iranian	3	2

Table 2 presents various aspects of the social vulnerability of the studied older adults in case of natural disasters. Accordingly, physical ability,

sense of safety, and awareness of danger are “relatively unfavorable” among the participants, and their mental abilities and social skills are

“unfavorable”. The total score of social (quantitative score) and ... highly vulnerable.... vulnerability of the participants is 74.48 ±6.2 (qualitative score).

TABLE 2: Assessment of Different Criteria of Social Vulnerability of Older Adults in Zahedan

Criterion	Mean ± standard deviation	Qualitative status
Physical ability	2 ±12.2	Relatively favorable
Social skills	3 ±19.2	Unfavorable
Mental ability	2 ±6.8	Unfavorable
Sense of safety and security	1 ±9.2	Relatively favorable
Awareness of danger	0 ±11.88	Relatively favorable
Total score74.48 ± 6.2high ...

The results of correlation analysis demonstrate Zahedan has a significant relationship with age, that social vulnerability of older adults in gender, education, and occupational status.

TABLE 3: Pearson Correlation Coefficient between Older Adults’ Demographics and Social Vulnerability to Natural Disasters

Variable	Correlation coefficient	Significance
Age	0.340	<0.001
Gender	0.220	<0.001
Education	0.251	<0.001
Occupational status	0.390	<0.001

DISCUSSION

The present study aimed to assess the social vulnerability of older adults in Zahedan in case of natural disasters in 2023. A total of 150 older adults (mean age 72.4±9.5) took part in this study and completed the questionnaire “social vulnerability of older adults to natural disasters”. According to the assessment of the obtained scores, the criteria of physical ability, sense of safety, and awareness of danger are “relatively unfavorable” among these individuals. The results suggest that the older residents of Zahedan have a high social vulnerability in case of natural disasters. The present condition is alarming and, therefore, must be addressed by health care managers and crisis managers as well as older people themselves.

The results of correlation analysis demonstrate that the social vulnerability of older adults in Zahedan has a significant relationship with age, gender, education, and occupational status. One of the factors increasing social vulnerability in case of natural disasters is old age, as well as

other individual characteristics, mental abilities and social skills, and cultural and religious backgrounds. Due to their age, older adults experience reduced physical and mental abilities, which affect their wellbeing and quality of life. On the other hand, after a natural disaster or calamity, tension and stress heighten among the affected families and the society in general. Therefore, the needs of people of other age groups, especially children’s, are prioritized over the care for older adults. This causes a sense of social rejection in older people and will ensue considerable social damage (14, 18).

According to the findings of a similar research by Soltani Nejad et al., the elderly are estimated as one of the most vulnerable social groups during earthquakes. As a result, these individuals are predicted to undergo memory disorders, loss of sense of direction, and social as well as psychological damage under these circumstances. The said study aimed to investigate the social vulnerability of older residents in East Azerbaijan and Kerman

provinces, Iran, after an earthquake. The qualitative findings of that research highlighted the social damage resulting from an earthquake, including social incompatibility, social isolation, social rejection, and lack of social support. The quantitative findings demonstrate that scores related to social adaptation and sense of support and acceptance in older individuals who were affected by the earthquake were considerably lower compared to other peers who were unaffected by the event (22). Schröder-Butterfill et al. maintained that homelessness, independence, loss, dependency, loneliness, and lack of relations make older adults more vulnerable. They also demonstrated that in the face of a catastrophe, inequality and inability to access social support intensify the vulnerability of older adults (23). Also, in line with the present study, Daddoust et al. conducted a qualitative content analysis in 2015 in Iran that involved semi-structured interviews with 24 older people. They aimed to assess vulnerability in relation to disasters and explore its contributory factors based on the perceptions and experiences of older adults. The findings showed that age is not the only criterion that makes these individuals vulnerable; rather, the achievements and experiences accumulated during their lifetime can also predict their vulnerability (24). Another review study aimed to investigate various aspects of social vulnerability of older people in case of natural disasters based on international experiences. The results of conceptual analysis showed that social vulnerability is a complicated, dynamic, challenging, and multi-dimensional underlying condition that is related to personal characteristics as well as economic status and is affected by cultural background and place of residence. All these factors make older adults vulnerable to health issues, economic consequences, and limitations caused in the aftermath of natural disasters (25).

The present study revealed that it is important to take the physical and mental wellbeing of older adults into account at all times, especially under circumstances such as natural disasters. However, one must not neglect various social harms to older people that are caused by such incidents. Concerning the case study, systematic and integrated planning should be implemented

by the relevant authorities in order to minimize the social vulnerability of older residents of Zahedan after natural disasters. In addition to issues caused specifically due to old age, social vulnerability challenges various neglected aspects of older adults' life such as physical and mental abilities, social skills, sense of security and safety, and level of awareness of danger. According to the findings of this research, criteria such as physical ability, sense of safety, and awareness of danger are "relatively unfavorable" in older individuals in question. Consequently, it is imperative to plan and take appropriate measures in order to reduce and control such negative outcomes.

It seems that when natural disasters occur, the first priority of authorities and policymakers is to overcome immediate problems such as food supply and economic issues. Therefore, vulnerable social groups such as older people are unintentionally ignored. That is why families play a key role in this regard. On the other hand, due to the nature of social vulnerability, its harmful impacts might appear years after the occurrence of natural disasters. Therefore, the authorities and policymakers should take into consideration the social wellbeing of people of all age groups, especially older adults, and take the necessary measures to control such losses (26, 27).

Family members as well as officials and authority figures can have a great impact on reducing the vulnerability of older adults. For this purpose, programs including workshops and pamphlets must be designed and provided by health care facilities in order to raise families' awareness about issues related to older adults. Family members should know that in case of natural disasters, older adults are highly vulnerable to feelings of hopelessness and depression. They need to be informed about how to adopt proper behaviors in response to this situation in order to minimize the social impacts of such events on this susceptible group. Reducing vulnerability of older adults after natural disasters is not possible without considering these issues and rehabilitation (28, 29). The findings of the present study should alarm the authorities in the health care sector and encourage them to take the

necessary measures in terms of prevention, preparedness, reaction, and recovery.

This research has limitations due to its single-center and single-group design. Therefore, it is suggested that future researchers consider a multicenter layout for their study (several cities from different provinces) and focus on older people who have experienced natural disasters. Hence, it will be possible to better compare and evaluate different dimensions of social vulnerability.

CONCLUSION

The findings of this study demonstrate that older residents of Zahedan have a high social vulnerability after natural disasters. In terms of mental ability and social skills, the status of the participants was “unfavorable”. Also, they showed a “relatively unfavorable” status in terms of physical ability, sense of safety and security, and awareness of danger. The current situation must be brought into the attention of authorities so that effective plans and solutions could be designed and implemented, because the occurrence of natural disasters is inevitable and older adults are among the most socially-vulnerable groups and need special attention.

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Ethical considerations

This research has been approved by the Ethics Committee of Zahedan University of Medical Sciences (IR.ZAUMS.REC.1401.265). After the objectives and advantages of participating in the study were explained, we obtained an oral and written consent from all older adults who expressed their willingness to enter this study. Maintaining the confidentiality of all the recorded information was among other measures that we took with respect to ethical considerations. Throughout the course of this research no costs or expenses were imposed on the participants. In all stages of the study, we adhered to the principles of the Helsinki

Convention and respected the civil liberties of the participants. They were also ensured about the voluntary nature of their participation in this study and the fact that they could withdraw at any stage.

Following the principles of research ethics

This research has been registered by the ethics committee of Zahedan University of Medical Sciences. ethics code IR.ZAUMS.REC.1401.265

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Contributing authors

All authors participated in writing the initial draft of the present article and its revision. All of the contributing authors share the responsibility for the accuracy and correctness of the contents of this article.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interests in the present study.

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