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SOCIAL DETERMINANTS OF DISASTERS OCCURRENCE AND INJURIES: A SCOPING LITERATURE REVIEW

Javad Babaie[1, 2], Mohsen Nori[3], Behrouz Samei[1]

[1]Social Determinants of Health Research Center, Health Management and Safety Promotion Research Institute, Tabriz University of Medical Sciences, Tabriz, Iran
[2]Tabriz Health Services Management Research Center, Health Management and Safety Promotion Research Institute, Tabriz University of Medical Sciences, Tabriz, Iran
[3]Department of Disaster's Public Health, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran

ABSTRACT

INTRODUCTION: Disasters are the result of interaction between hazards, vulnerabilities, and capacities. Social factors play a vital role in the occurrence of disasters and their related injuries too. Accordingly, the present study aimed to identify the social determinants of disasters and their associated injuries.

METHODS: In this scoping review, grey literature, as well as international and Iranian databases were extensively reviewed using the keywords associated with the title of the study. They were then screened and finally, the related studies were employed in the present study.

RESULTS: A total of 14 categories were identified as social factors contributing to the occurrence of disasters and the related injuries including demographic characteristics, literacy and illiteracy, employment and unemployment, place of residence and its quality, social infrastructure, society disaster risk perception, social capital, community health status, trusteeship and leadership, cultural factors and community participation, economic status, minority, family management, and social harms.

CONCLUSIONS: In general, various social factors were found to affect the occurrence of disasters and their injuries, which should be taken into account when planning to reduce the risk of disasters. However, such programs are not certainly comprehensive without considering these factors.

KEY WORDS: disasters; social factors; injuries; vulnerability

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INTRODUCTION

Disasters are so-called widespread events that have constantly challenged human lives throughout history. These events impose destructive effects on human societies and subdue them with their power [1]. For example, disasters have killed more than 700 000 worldwide, injured more than 1.4 million and made 23 million homeless during 2005–2015 [2]. In 2015, a total of 376 disasters occurred in 117 countries, causing 22 765 deaths and affecting 110.3 million [3]. In the 21st century, earthquakes led to the death of 1.87 million worldwide. During 1980–2009, 372 534 deaths, as well as 995 219 injuries occurred and more than 61 million

ADDRESS FOR CORRESPONDENCE:
Javad Babaie, Social Determinants of Health Research Center, Health Management and Safety Promotion Research Institute, Tabriz University of Medical Sciences, Tabriz, Iran
e-mail: Javad1403@yahoo.com
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were affected by the earthquakes [4]. Japan (2011) and Haiti (2010) earthquakes with 28 000 and 225 000 deaths, respectively, are examples of these deadly events in recent years [4]. Based on global reports, new hazards, leading to severe economic, social, health, cultural, and environmental effects, have been created in recent years too [2].

Furthermore, scholars claim that the global climate is changing [5] and due to human activities the process of such a change is alarming. The intergovernmental panel on climate change, while confirming this change, predicts that the frequency and severity of natural hazards related to climate change such as floods, extreme weather, and droughts *etc.* will increase in the future [6]. Therefore, although disasters are among the most widespread phenomena in the world, they will be more prevalent in the coming years. Despite the fact that different governments around the world have taken various actions, especially after the 1990s nomination as a Decade of Disaster Reduction, [3] disasters continue to disrupt the lives of the people worldwide.

Natural hazards cause no problem per se since many of them are part of the function of nature. However, these hazards create substantial human losses when they occur in vulnerable communities [7]. Vulnerability has different dimensions and many factors are involved in its formation. The social dimension, for instance, is one of the important dimensions of vulnerability and social factors are effective in creating and enhancing vulnerabilities [8].

Social determinants and factors contributing to the occurrence of disasters, deaths, and their resulting injuries have not yet been well identified. Given that the lack or weakness of these factors can affect the rate of vulnerability or capacity of the community to respond to disasters, identifying these hazards can help the authorities to take the necessary interventions. Accordingly, the current study sought to identify the social determinants of the occurrence of the disaster and their related injuries.

METHODS

Effective social factors on the occurrence of the disasters and their related injuries were extracted through scoping literature review using Arksey and O'Malley's proposed framework (Hilary Arksey, 2007 #10237). To this end, keywords such as the 'social determinants', 'social factors', 'effective factors', 'disasters', 'natural disasters', 'manmade disasters', 'technological disasters', 'injuries', in combination with each other were searched on international and national databases until 2018 (*e.g.*, Web of Science, Scopus, Medline, as well as Magiran, SID, Iranmedex, Medlib, and Irandoc) and Google Scholar search engine.

The search strategy was:

((social determinants [Title/Abstract]) OR social factors [Title/Abstract]) OR effective factors [Title/Abstract]) AND disasters))), (((social determinants[Title/Abstract]) OR social factors[Title/Abstract]) OR effective factors[Title/Abstract]) AND injuries))), (((social determinants[Title/Abstract]) OR social factors[Title/Abstract]) OR effective factors[Title/Abstract]) AND natural disasters))), (((social determinants[Title/Abstract]) OR social factors[Title/Abstract]) OR effective factors[Title/Abstract]) AND manmade disasters))), (((social determinants[Title/Abstract]) OR social factors[Title/Abstract]) OR effective factors[Title/Abstract]) AND technological disasters))).

Moreover, manual search methods for the references of the related articles, as well as grey literature and guidelines were used to complete the investigation.

The search results were entered into the EndNote X6 software and duplicated titles were deleted. Then, two researchers examined the titles of the remaining articles in terms of their relevance and expressed their opinion in this regard. Finally, the investigated articles were included in the study if they were related to the title, otherwise, they were excluded. In the case of any conflict, the problem was resolved by the consensus between the researchers. After removing unrelated titles, the abstracts of the articles and their relevance to the topic of the current research review were studied by two researchers. At this stage, unrelated articles were excluded from the study. Then, the original texts of the remaining articles were investigated and the social factors affecting the disasters and the resulting injuries were extracted by means of using a data extraction table.

The inclusion criteria were having an abstract in English or Persian, addressing the factors affecting the disasters and injuries, and being original or review articles.

Additionally, the exclusion criteria included the lack of the above-mentioned criteria, lack of access to the articles, letters to the editor, and articles written for the congress and conferences.

RESULTS

Searching for the keywords in international and Iranian databases resulted in 2,743 articles, out of which 2,344 titles were identified as irrelevant to the topic by initial screening (reviewing the titles) and were excluded from the study. In addition, a number of 51 articles out of the 348 remaining articles were duplicates and thus were removed. Further, the investigation into the abstracts of the remaining 348 articles, whose titles were related to the topic of the study, 315 other articles were found to be irrelevant, and finally, 34 articles were left. It is noteworthy that 4 other articles, obtained from a manual review of the references of the articles, were added, and finally, 38 articles were studied.

Totally, 15 countries around the world conducted studies among which Iran ranked first followed by the United States and China. The first paper in this regard was published in 2003, and since 2015, 7 articles have been published per year. In other words, a total of 104 researchers implemented and published these articles (on average, 2.79 persons per article). The details related to the articles and their findings are provided in Table 1.

In these 38 articles, 426 social factors were generally highlighted which were then merged. Therefore, 14 categories of contributing social factors related to the occurrence of disasters and the resulting injuries were identified as follows:

1. Demographic characteristics
2. Literacy and illiteracy
3. Employment and unemployment
4. Place of residence and its quality
5. Infrastructures status
6. Society risk perception
7. Social capital
8. Health status of the community
9. Trusteeship and leadership (quality of community administration)
10. Cultural factors and community participation
11. Economic status
12. Minority
13. Family management status
14. Social harms.

The social factors, included in the subgroup of these categories, are presented in Table 2 in detail.

DISCUSSION

The current study aimed to provide a scoping overview to identify the social determinants of disasters and their resulting injuries. To this end, the keywords were searched on international and national databases and the articles were screened, out of which 38 related cases were included in the study. Then, social factors were extracted accordingly. Finally, after integrating similar ones, and classifying the obtained factors, the number of 14 categories of social factors were determined.

Population density, namely, the number of inhabitants per square kilometer of land area, was among the social determinants in many articles. According to the authors of these articles, the greater density of the population in a community causes further injuries to the individuals from the disaster. However, high population density can be due to high population growth or low income which leads to the residency of a higher number of people in a small area. Furthermore, the proportion of children and adolescents is greater in societies in which the rate of population growth is high. Therefore, the higher the number of children in a community, the more vulnerable that community is. Population quality and structure, as well as age and gender structure, are other factors that can be related to vulnerability and to each other.

Moreover, a high proportion of the elderly in the population structure of a community can be another factor regarding the vulnerability of that community. Living in a village and high proportion of the rural population in a society is considered as one of the influential factors in the creation of more vulnerability and, accordingly, can be a major cause of alteration of a hazard to disaster and thus leading to high rate of death and morbidity.

Studying and understanding the available resources are regarded as factors that help humans obtain the required information in different areas, including the method of preventing and reducing the risk of disasters and taking actions accordingly. This is naturally associated with the literacy of the individuals. Additionally, observing justice in such training (*e.g.*, all the people in society including women and girls have access to educational facilities and the literacy rate of the women is high) was another social factor that, according to the authors of the articles, was related to the disasters and the resulting injuries.

Employment status in the community, unemployment rate, employment in one sector or insecure occupations, employment in primary occupations, as well as the number of people working in an

Table 1. Specifications of the articles and documents identified by the extensive article review in Iranian and international databases and social factors mentioned in such databases

	Journal title	Publication year	Social determinants of disasters occurrence and injuries
1	Journal of Rescue and Relief	2012	Density, marginalization, urbanization, culture of hazard, quality of life [9]
2	Journal of Geographic Space	2015	Income, education, risk perception, age, social capital, quality of neighborhood, gender, knowledge, job status and dignity, social base, fidelity, race, religion, attitude, social relation [10]
3	Urban Management Studies	2017	Density, historical characteristics, urbanization, cultural characteristics, education, security, human right [11]
4	Journal of Geographic Space	2014	Institutional factors, neighborhood, social collaboration, accessibility to health and local services [12]
5	Disaster Management and Prevention Knowledge	2016	Social capital, culture, public engagement, health, health care coverage, knowledge, risk attitude, local risk perception, quality of life, special needs groups, age, skills [13]
6	Disaster Management and Prevention Knowledge	2017	Unsafe occupation, population density, risk perception, job, vulnerable groups, education, leadership, management, social capacity, response mechanisms, adaptation strategies, governance, ethical standards, NGOs, responsibility [14]
7	Journal of Geographic and Planning	2016	Poverty, engagement culture, density, occupation, settlement texture, family size, illiteracy, population growth, sex [15]
8	Journal of Natural Environment Hazard	2016	Density, marginalization, informal settlement [16]
9	Human Geography Research Quarterly	2015	Density [17]
10	Human Geography Research Quarterly	2017	Density, education, poverty, risk perception, sex, age, health, ownership status [18]
11	Journal of Environmental Planning and Management	2015	social capital (trust, norms, networks), human capital (education, health, skills, information), economic capital (income, savings, investments), demographics (age, race, class, gender, occupation, social networks and embeddedness, community values, cohesion), economic (employment, property, wealth generation, municipal finance/revenues) [19]
12	Journal of Homeland Security and Emergency Management	2011	Socio-economic status: income, poverty, employment, education, household composition/disability: age, single parenting, disability, minority status/ language, race, ethnicity, marginalization, language [20]
13	Plos One	2018	Demographics, population density, illiteracy, migration, community services: health access, access to sanitation, transportation, urban green space, fire station, sheltering capacity, economic stability, employment [21]
14	Nat Hazards	2014	Social vulnerability (socio-economic, built environmental), rural, agricultural population, employing structure, urbanization, age structure, medical services, population density, savings, gender, education, medical services, transportation, development [22]
15	International Conference on Circuits and Systems (CAS 2015)	2015	Coverage of police office and fire brigade, medical institution, medical staff, risk perception, social insurance, income, employment, illiteracy, age, density, population growth rate, dependency rate [23]
16	Nat Hazards	2012	Total population, housing unit, sex, race, mobile homes, poverty, telephone availability, vehicle availability, family structure, urbanization, ethnicity, occupation, employment, social instability, social achieved, social ascribed [22]
17	Sustainability	2016	Economic factor, GDP, density, industrialization, poverty, quality of population, floating population [24]
18	Disaster Prevention and Management	2016	Culture, region, tradition, divorce, abortion, euthanasia, suicide [25]

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Table 1 (cont.). Specifications of the articles and documents identified by the extensive article review in Iranian and international databases and social factors mentioned in such databases

	Journal title	Publication year	Social determinants of disasters occurrence and injuries
19	Nat Hazards	2015	Governance, health, well-being, previous experience, age, gender, faith organizations, language, social networks, sense of community, risk perception, risk awareness, educational level, personal faith, trust in authorities [26]
20	Journal of Comparative Policy Analysis: Research and Practice	2012	Gender, social class, ethnicity, race, seniority, place, social networks [27]
21	Disasters	2016	Education, training, markets, institution, poor infrastructure, population growth, freedom, urbanization [28]
22	International Journal of Disaster Risk Reduction	2017	Social networks, school networks [29]
23	Graduate School of Management Research	2012	health status, education, awareness, social capital, demographics, social networks, values [30]
24	International Journal of Strategic Property Management	2010	Culture [31]
25	Not published in a journal	2013	Social networks [32]
26	Marine technology society journal	2006	Poverty, gender, age, disability, minority, tenancy, race, ethnicity [33]
27	International Journal of Disaster Risk Reduction	2016	Gender, public health conditions, public infrastructure, migration, divorce, population density, race, ethnicity, minority, housing, social security, population growth, education, rural-urban areas, employment, inequality, social networks, dependency, group quarters, level of democracy, gender equity, disability, stakeholder involvement, special needs population, working population in primary, secondary and tertiary sector [34]
28	Asia Pacific Viewpoint	2014	Inequality, poverty, infant mortality, income, urbanization [35]
29	International Journal of Disaster Risk Reduction	2017	Poverty, gender, marginalization, medicinal plants, organizational networks, social cohesion, political cohesion, economic affluence, governance, migration, tribes, aging [36]
30	Demography	2007	Social inequality, population, organization, rural population, density, household size, minorities, race, educational rate, linguistic differences, poverty [37]
31	International Journal of Disaster Risk Reduction	2017	Culture, social perception [38]
32	Int J Disaster Risk Sci	2017	Capability, social capital, knowledge, participation, human rights, governance structure, social protection, lifestyle, population growth, culture, customs, habitual practices, family networks, family support [39]
33	The Australian Journal of Emergency Management	2007	Trust, leadership, collective efficacy, social capital, social cohesion and sense of community, community involvement, existing norms/ attitudes/values, communication and information, resource dependency [40]
34	Urban - Regional Studies and Research Journal	2011	Age, gender, education, knowledge, poverty, marginalization, race, ethnicity, beliefs, religion [41]
35	The Australasian Journal of Disaster and Trauma Studies	2010	Governance, resilience, social capital, social change, migration, tourists and tourism industry [42]
36	Social science quarterly	2003	Personal wealth (poverty), Age, density of the built environment (density of manufacturing and commercial establishment housing units, new housing permit), economic dependency, housing stock and tenancy, ethnicity, infrastructure dependence [43]

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Table 1 (cont.). Specifications of the articles and documents identified by the extensive article review in Iranian and international databases and social factors mentioned in such databases

	Journal title	Publication year	Social determinants of disasters occurrence and injuries
37	Norwegian Journal of Geography	2011	Population structure and socioeconomic status (households with income less than population 67 years or older, population living in nursing homes, receiving invalidity pension , households earning more, median income, participating in the labor force , population with 5 years or younger, employed in health care and social services), skill (only lower secondary education, employed in primary sector, first or second generation non-western immigrants, first generation western immigrants, employed in low skill service sector, with 4 years or more of tertiary education, gender equality, value of housing units), unemployment and demographic lability (unemployed, population moving to other municipalities, single-parent households, median per capita capital assets) [44]
38	Plos Currents Disasters	2015	Educational equity, age, transportation access, communication capacity, language competency, special needs people, health coverage, housing capital, employment, equality, single sector employment, female employment, business size, migration, political engagement, social capital, religion, social security [45]

Table 2. Influential social factors in the occurrence of disasters and their associated injuries

Social dimension	Social vulnerability examples
Demographic characteristics	Population high density, high family size, a high proportion of children and the elderly in total population, gender and gender inequity
Literacy and illiteracy status	High rates of illiteracy, low illiteracy, education inequity
Special features	Disability, single parenting, accommodation in sanatorium
Health status	Health services accessibility, health indicators low rates, lack of health specialists
Employment and unemployment	High rates of unemployment, job inequity, occupancy in initial levels of industrials, tourism status
Trusteeship and leadership (quality of community administration)	Society government status, government durability, government structure, level of democracy
Attitude to risk	Risk awareness, risk attitude, risk understanding, risk perception
Place of residence and its quality	Marginalization, villagers, low quality of neighborhood, residency in un-safe and vulnerable structures, slums, residential context, informal accommodation
Economic status	Low income, high liability, high inflation, economical disruptions, rate economical dependency, high prevalence of poverty
Social capital	Low social cohesion, low political participation, low social participation, cultural characteristics, social capital, social relationship, social capacity, social networks, social instability, social class, social security, social order (discipline), social changes, historical characteristics, social equity, human right, human capital, lifestyle, quality of life,
Minority	Minority races and religions, minorities, linguistic differences, migration
Family management status	Family structure, family size, familial networks, family support
Social harms	Victims of social harms, divorce, suicide, crime, rape, distrust, addiction, theft, violence, smuggling, captivity, prisoner
Infrastructures status	Accessibility to social and local services (fire stop stations, EMS, Police, shelter, lifelines, mass media)
Community governance	Governance stability, governance structure, level of democracy, community management and leadership, adaptation strategies, organizational networks, trust on governance

industry, tourism, and health area were all among the factors which were effective in the occurrence of the disasters and injuries.

In addition, individuals' employment was perceived to be directly related to their income. Income can be effective in reducing the risk of disaster, along with being a source of many other actions and factors. High income causes people not to select high-risk areas for living. Further, it helps the individuals use engineering methods and more resistant materials in building their residences against the hazards, ensure their buildings and properties, and finally, compensate for the occurred disasters and return to their lives more quickly. Furthermore, there exist other occupations including farming and fishing which are directly related to hazards such as fire, drought, tsunami, flood, hurricane, and all kinds of storms. Dependence on an occupation, especially vulnerable jobs against economic problems, can put the employees at risk. Women's occupation and employment were other cases highlighted in different studies.

Although the place of residence, where people select to live, is itself affected by several other factors, it is one of the factors contributing to the incidence of disasters and an increase in the number of injuries. There are many people who live in informal settlements and outskirts of the towns and villages. These places are insecure and engineering principles are not observed in their construction. Moreover, they do not have access to social services and are vulnerable to the occurrence of different hazards. Additionally, providing emergency relief is very difficult and occasionally impossible for these places. In addition, urbanization and slums can have positive or negative effects on the occurrence of disasters due to their features, advantages, and disadvantages. Being on a lease and housing per capita for the households are among the other issues highlighted in the investigated articles. Finally, other social harms such as immigration, divorce, and suicide should be considered along with the above-mentioned factors.

The existence and quality of various physical and social infrastructures such as communication lines, energy supply, roads and paths, hospitals, as well as health and therapeutic centers, fire stations, police, as well as relief and rescue bases, transportation services, urban green spaces, safe shelters, and harbors, and industrialization have noticeable effects on reducing the rate of vulnerability considering the extent to which the societies enjoy these factors.

Different communities and individuals have various views and attitudes toward disasters. They attribute some of these disasters to God or nature, consider them as an inseparable part of nature, and believe that humankind is subdued by these disasters; further, they cannot take actions to prevent or decrease the risk and thus are stuck with the disasters given their destiny and chance. There are other groups of people and communities who do not consider the risk of such cases negligible and therefore do not take them seriously. Furthermore, they suppose the disasters are far from them and their own place of residence and never imagine a day in which they are stuck. Such people and communities cannot think of the disaster until they are involved in it. Contrarily, still other individuals and societies believe that many of the hazards and related disasters are predictable and preventable even in unavoidable cases including earthquakes. Accordingly, measures can be taken to reduce and minimize the risks imposed by such disasters. These views are considered social factors which themselves are affected by the communities and thus can play a crucial role in managing the disasters.

The health status of the community, the coverage of health services, the health facilities availability in the communities and their services accessible to the public, and the readiness of these facilities to provide the required health services for the people and victims in the event of disasters are among the factors which can be extremely effective in reducing the injuries and complications resulting from such disasters.

A large number of studies focus on various issues such as the governments' perspectives on the disasters and the importance of their long-term and short-term plans for decreasing the risk of disasters; whether there are organizations for managing and mitigating the disaster risks; what workgroups and committees are predicted and formed to manage these disasters; how they are funded and, in sum, the trusteeship of the governments for undertaking activities to reduce the risk of the disasters.

Collective and community-based practices and actions are among the necessary actions for reducing the risk of disasters which require a serious and extensive contribution of the members of society. Moreover, the cooperation culture of the people can play a significant role in this respect.

Communities, that belong to a minority group, have different religions, races; languages, customs,

and traditions compared to the majority of people and are occasionally rejected by society for some reasons. Accordingly, they become extremely vulnerable to various factors. Linguistic barriers often cause people not to understand the issued warnings appropriately and thus fail to take timely and effective actions.

The family is at the center of taking action for reducing the risk of disasters. The households' preparation to face disasters has long been part of the agenda of international organizations. However, the structure of the families, family relationships, household size, family network and support, as well as women's role as a single parent or the head of the household can influence these actions.

The risk is the result of an interaction between both natural and human-made hazards and vulnerability in the available resources for disaster management [44]. Both of these factors are somehow influenced by human and social factors. As mentioned earlier, climate change is one of the suspicious factors in increasing the incidence and severity of different types of hazards [5, 6]. Climate change is itself the outcome of human and social activities. Therefore, any action to decrease the risk of disasters necessitates identifying these factors and undertaking extensive interventions.

The Rockefeller Foundation identified seven groups of factors contributing to inequity in the field of health (*e.g.*, residency, race, occupation, gender, religion, education, economic status, and social capital), all of which were found within the extracted groups of the current study. Although the above-mentioned factors were determined to be effective in creating or worsening the inequity in health, they can have a role in the occurrence of disasters [45]. In a document titled *Social Determinants of Health*, five categories were pointed out, among which age, gender, and heritage were highlighted. Despite the agricultural and food production group, the remaining social determinants of health influence the disasters and their imposed injuries.

Tagighzadeh et al. extracted various social factors from different articles including academic justice, age, accessibility to transportation systems, communication capacities, language, coverage of health services, housing per capita, employment, income, and its distribution, women's employment, business type and size, political integration, social capital migration, and place of residence [45]. The findings of the current study are in conformity with the factors noted in the above-mentioned article.

In another study, Pavgolia et al. [46] pinpointed the value of property and building, along with the year of its construction as the contributing factors in evaluating the features of social vulnerabilities in the forest fire. However, demographic characteristics had no effect while the type and lifestyle, as well as the perceived risk, demonstrated a poor connection with the incidence of fire in the forests. Although the present study sought to identify the factors affecting the occurrence of disasters rather than attempting to find statistical relationships, many of the cases noted in the above-mentioned study were found in the current study.

Additionally, Aldrich et al. [47] highlighted the role of the height of tsunami waves, as well as the stocks of social capital, and the level of political support in the mortality rate. The present study focused on social capital and political support as well.

Andrewin et al. [48], found a strong and positive relationship between the total area of the land allocated to agriculture, as well as the percentage of urban population and the mortality rate resulting from the hazards related to climate change. In the present study, employment in agricultural occupations, along with dependence on one type of occupation and income were indicated as factors of vulnerability.

LIMITATIONS

In this scoping review, only Persian and English language articles were considered. Also, in some cases, decision-making about including or moving of articles was difficult. We tried to address this challenge by consensus between authors.

CONCLUSION

In general, the conversion of hazards into disasters and thus the creation of mortality and injury is the result of its occurrence in a vulnerable society. In addition, vulnerability has different dimensions the social dimension of which was addressed in the present study, and 15 groups of effective social factors were identified accordingly. There are more detailed factors within these factors which play a determinant role in the occurrence of disasters. Therefore, authorities are recommended to consider all these factors and design interventions which cover them collectively. And also addressing health inequity and socio-economic inequality is important in

decreasing of negative effects of climate change and other disasters.

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Ethical considerations

The interviews were conducted after obtaining written informed consent from the participants who were allowed to skip any item they wished not to respond or discontinue the study at any stage. Further, personal information was removed to maintain the confidentiality of the data. Furthermore, all the recorded interviews were deleted at the end of the study. Participation in the interview had no cost for the interviewees except for the time. It is noteworthy that the current study was approved by the Ethics Committee of Tabriz University of Medical Sciences under the ethical code of 5/D/52448.

Conflict of interest

There is no competing interest.

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