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Assessing the method of providing health services to at-risk groups during natural events (earthquake): A systematic review

Ali Ramezankhani, Maryam Sabouri¹

Department of Public Health, Faculty of Health, Shahid Beheshti University of Medical Sciences, Tehran, Iran, ¹Health Education and Health Promotion, School of Public Health and Safety, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Address for correspondence:

Ali Ramezankhani, Professor, Department of Public Health, School of Public Health and Safety, Shahid Beheshti University of Medical Sciences, Tehran, Iran.
Maryam Sabouri, PhD Student of Health Education and Health Promotion, Department of Public Health, School of Public Health and Safety, Shahid Beheshti University of Medical Sciences, Tehran, Iran.
E-mail: sabouri@sbm.ac.ir

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Abstract:

Disasters create a large amount of human needs. Health services in natural disasters are considered the main factor of human survival. The present study was conducted to determine the method of providing health services to at-risk groups during natural events such as earthquakes in 2022. This systematic review was conducted based on English and Persian studies published in Web of Science, Google Scholar, Scopus, Science Direct, and PubMed databases, as well as internal databases including SID, Magiran in the fields of title, abstract, and keywords such as natural disaster, earthquake, health services, mental health services, psychosocial support system, nursing services, relief, mental and physical health, and its MeSH equivalents with all of the possible combinations. Finally, 11 studies were identified as eligible among the 48 ones found in the initial search. To examine the quality of studies, the Joanna Briggs Institute (JBI) and STROBE evaluation checklists were used. Based on the results, 1834 studies were found after screening and investigating the inclusion criteria, among which 237 and 1549 were excluded due to repetition and unrelated titles, respectively. Then, 48 studies remained after reviewing their abstracts, resulting in including 11 in English ($N = 10$) and Persian ($N = 1$) from different countries during 2003–2020. The reviewed studies included semi-experimental and experimental ($N = 5$) and descriptive ones ($N = 6$). A large number of studies ($N = 21$) were related to providing services in the event of multiple disasters and were excluded. About 92% ($N = 10$) of the studies were conducted in English and more than 90% were related to providing services after the earthquake including providing mental health services ($N = 6$), the cognitive behavioral intervention ($N = 3$), rapid assessment of needs ($N = 1$), as well as mental health services and disaster education ($N = 1$). The vast majority of studies demonstrated improvement in psychosocial functioning, facilitation of children's normal development, and successful adaptive functioning with an intervention. Based on the results, mental health training affects more when local people are trained to assess the victims based on mental and psychological status. Earthquake is regarded as an opportunity that allows professionals to discover and introduce intervention combination modules to provide mental health services while helping victims who need emotional support and comfort. However, various types of services should be provided, especially in earthquake-prone areas before and after the earthquake in order to achieve a life with fewer complications and a higher quality considering the amount of trouble created by such disaster as a special condition.

Keywords:

Earthquake, mental health, natural disaster, providing services, systematic review

Introduction

Natural disasters are as old as human history and are intertwined with the

fate of the earth and heavens. No society can be considered immune from such disasters.^[1] Natural disasters create a severe geographical rupture or emergency situations with high intensity,^[2] which potentially harms people,

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assets, service systems, or the surrounding environment,^[3] leads to death, damage, financial and life injuries, and illness, and cannot be managed with the normal course of life and existing resources effectively.^[2] A large number of studies have been conducted on the consequences of disasters, which can lead to large numbers of deaths, high costs over time,^[4] major economic and political impacts,^[5] psychosocial disorders, destruction of infrastructure, damage to residential houses, loss of property, and disruption of social life in communities.^[6]

Earthquake is among the most destructive natural disasters which can lead to huge damages in the area within a few seconds.^[7] The occurrence of natural disasters such as earthquake creates special conditions in society, generates new requirements, disrupts the conventional patterns of life, plunges people into special mental and emotional conditions,^[8] leads to a lot of life and financial losses in human settlements, destroys long-term investments, and endangers the development and progress of the country.^[9]

Earthquake reduces the survivors' physical health, aggravates chronic diseases, and decreases access to health services.^[10] Thus, a large number of people need appropriate health care following a disaster.^[11] Based on the increasing evidence, post-traumatic stress disorder (PTSD), depression, and anxiety affect the quality of life and performance negatively and significantly,^[12] which should be addressed seriously.^[10] In addition, health systems should provide services to reduce the effects of earthquakes and decrease the mortality rate and complications of disorders according to their inherent duty.^[13]

Different types of services including health, educational, psychological, nursing, and relief ones during the earthquake were discussed in order to help crisis management specialists and decision makers to understand the method of providing health services before, during, and after the earthquake because managing any type of disaster affects the future and stability of the economic and social system in the society directly.

Materials and Methods

This review is in line with the recently extended guidelines of the PRISMA statement for reporting systematic reviews^[14] [Figure 1]. The present review includes an evidence-based minimum set of items for reporting in systematic reviews and meta-analyses.

Data sources and search strategies selection

The review was completed by PubMed, Web of Science, Google Scholar, Scopus, ScienceDirect, SID, and Magiran databases for English and Persian studies utilizing

relevant keywords, respectively. The search strategies included keywords and MeSH terms depending on the database, which was supplemented by synonyms and glossary terms.

The experimental, quasi-experimental, and descriptive studies which were published without a time limit until the end of 2022 in order to address the method of providing health services to at-risk groups during natural events such as earthquakes were searched. The search focused on experimental, semi-experimental, and descriptive studies which provided a type of service before, during, and after an earthquake. Inclusion criteria for eligibility included experimental and semi-experimental studies in which health services are provided for natural events such as earthquakes, descriptive studies which only examine the method of providing health services during earthquakes, and studies published in English or Persian.

Exclusion criteria included analyzing several natural disasters such as the simultaneous occurrence of earthquakes and tsunamis.

Searched studies were organized and classified based on study design, type of service provision, and service delivery time. Titles and abstracts were assessed by two reviewers separately. Data were extracted and analyzed by the above-mentioned reviewers on full-text studies. To control the quality of studies, two reviewers evaluated methodological sections and the quality of reporting for each study separately. Any doubtful issue was determined by other reviewers.

In order to achieve the relevant studies, a wide range of keywords listed in the MeSH such as "Natural Disaster," "Health Services," "Mental health services," "Support System," "Psychosocial," "Mental Health," and "Mental Hygiene" were searched.

The literature was searched by applying medical subject headings (MeSH) terms. The MeSH terms used in the search included ("Natural Disasters"[MeSH] OR "Disasters Natural"[MeSH] OR "Disaster Natural"[MeSH] OR "earthquakes" [MeSH]) AND ("Health Services"[MeSH] OR Services, Health[MeSH] OR Mental health services[Title/Abstract] OR "Psychosocial Support System" [Title/Abstract] OR "Support System, Psychosocial"[MeSH] OR Nursing services[Title/Abstract] OR Relief work[Title/Abstract]) AND ("Mental Health"[MeSH] OR Mental Hygiene[MeSH] OR Hygiene, Mental[MeSH] OR mental health[Title/Abstract] OR physical health[Title/Abstract])). The filters set for the search included text availability including full text, species including human only, and languages including English and Persian.

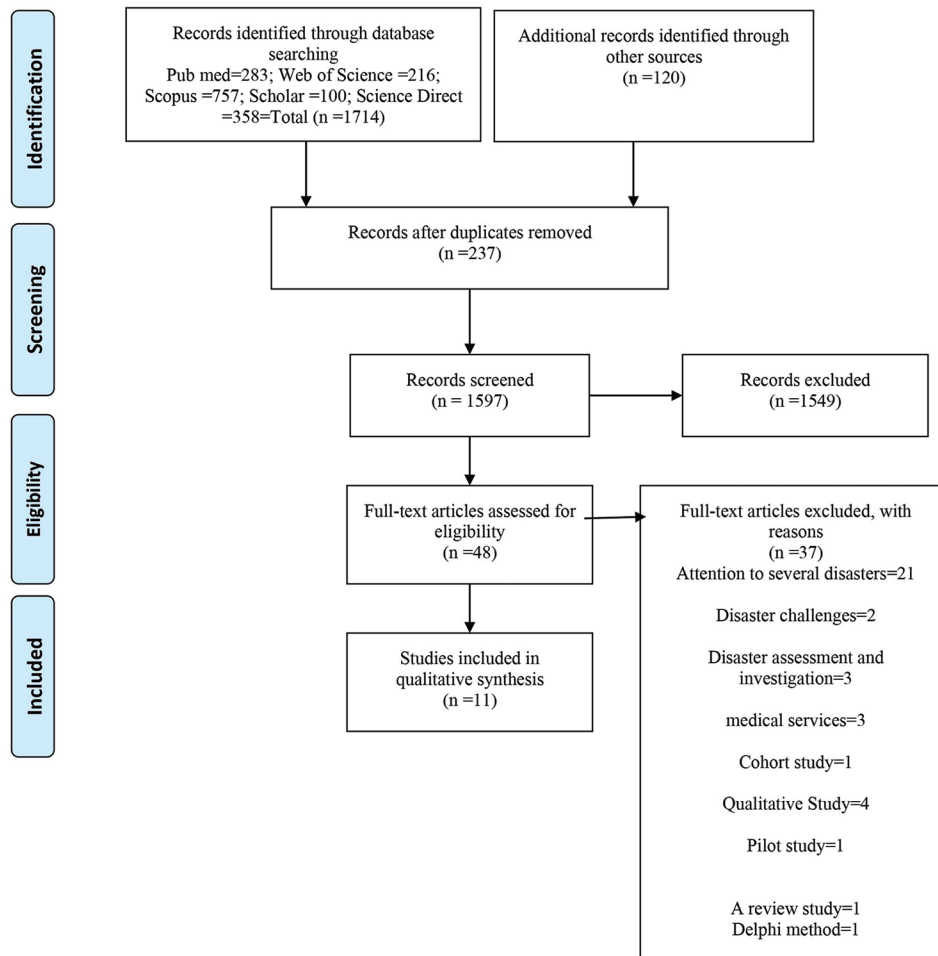


Figure 1: PRISMA flow diagram of systematic review inclusion and exclusion process

In order to select proper studies, two researchers extracted the relevant information independently utilizing a standard data mining form. To this aim, any mismatches in data mining were checked. The studies were reviewed and selected based on three stages as follows. During the first stage, citation information and the abstracts extracted from the databases were transferred to Endnote, titles of selected studies were examined, and repetitive or irrelevant issues to the main topic were removed. During the second stage, abstracts of remaining related studies were selected [Figure 1]. During the last stage, full texts were analyzed based on the inclusion and exclusion criteria. Finally, 11 studies that were incongruent with the objective were written in English or Persian, and full texts available to the researcher were selected and analyzed qualitatively.

Data extraction and quality assessment

This systematic review was conducted by applying the following data extraction steps and by assessing the quality of the studies and results. Studies were included through screening titles and abstracts of all of the publications passing the title/abstract screen by

two independent reviewers. All of the studies were categorized based on their characteristics including their aims, target group, number of lives lost, service delivery time, type of service provision, and the result of providing the service.

In order to investigate the quality of experimental, semi-experimental, and descriptive studies by two researchers independently, the critical evaluation checklist provided by JBI^[15] using nine designed questions and the STROBE statement checklist which includes 22 different sections with main items of title and abstract, introduction and method, results and discussion that was done by scoring 0 and 1 for each item^[16] [Table 1, Figures 2 and 3].

Results

The PRISMA flowchart in Figure 1 reviews the search process results. A total of 1834 articles were identified and screened for eligibility through three steps, among which 237 cases were removed due to being repetitive. Then, the titles of the articles were examined, and 1549 cases were excluded from the study since the

Table 1: Characteristics of included studies

| Study, year (ref) | Study design, country, language | Aims | Target group | The number of lives lost | Service delivery time | Type of service provision | The result of providing the service |
|---|--|--|---|----------------------------------|---|---|---|
| Welton-Mitchell et al. ^[17] (2018) | Quasi-experimental Study, Nepal, English | To assess the perceived preparedness and social cohesion that affect mental health for future disasters. | Two earthquake-affected communities in Nepal (six intervention groups of 20 participants each) | Nearly 9000 people were killed | About 2.5 months after the earthquake. | The 3-day intervention was culturally adapted, facilitated by trained Nepalese clinicians, and focused on enhancing disaster preparedness, mental health, and community cohesion. | This mental health-integrated disaster preparedness intervention was effective in enhancing resilience among earthquake-affected communities in Nepal. |
| Wolmer et al. ^[18] (2005) | Randomized Controlled Trial, Turkey, English | To explore two groups of school-age children three and a half years after August 1999 earthquake in Turkey. | Students (School-based interventions) | Approximately 18,000 people dead | Four to five months after the earthquake | The intervention consisted of eight 2-h meetings combining psychoeducational modules and cognitive-behavioral techniques | Facilitate children's normal development and successful adaptive functioning |
| Stratta et al. ^[19] (2014) | Descriptive Study Italy, English | To describe the utilization of public facilities for mental health by the population exposed to the earthquake. | The population affected by the L'Aquila (Italy) | Killed 309 people | Activities in the years 2008 to 2010 | Mental Health Service | Mental health interventions after disasters mobilize the internal resources of the people. |
| Giannopoulou et al. ^[20] (2006) | Randomized Controlled Trial, Athens, English | To examine the effects of a short-term group cognitive-behavioral intervention in children who were experiencing PTSD symptoms. | Twenty children, aged 8–12 years, in two groups referred for treatment to a local child mental health team were assigned. | The earthquake killed 143 people | Group 1 (n=10), which started treatment 2 months after the earthquake, and Group 2 (n=10), which started treatment 4 months post-earthquake | Cognitive-behavioral intervention | A statistically significant reduction in overall PTSD symptoms—intrusion, avoidance, and arousal—as well as in depressive symptoms was reported immediately after the intervention. |
| Akbari et al. ^[21] (2003) | Descriptive Study, Iran, English | To provide services and assess health needs, control diseases, and health care, and solve the problems of earthquake-affected people in the neighboring provinces. | People of Bam city | Approximately 35,000 people died | Within hours of the event | Rapid assessment of needs, evacuation of victims, primary and preventive care, health education activities | To responded immediately to the devastating earthquake in various ways including diagnosis and treatment management, providing environmental health services, setting up health facilities and field hospitals with international aid |
| Moriyama et al. ^[22] (2013) | Descriptive Study, Japan, English | To promote the reduction of people's emotional stress and the long-term risk of suicide among people who experience earthquake stress. | People affected by the earthquake in Japan | Unclear | After the Great East Japan Earthquake | Distributed pamphlets cover the following three stages: (1) the immediate aftermath of the earthquake, (2) six months, and (3) one year after the earthquake. | Promoting understanding about mental healthcare for those affected by natural disasters |

Contd...

Table 1: Contd...

| Study, year (ref) | Study design, country, language | Aims | Target group | The number of lives lost | Service delivery time | Type of service provision | The result of providing the service |
|---|---|---|---|------------------------------------|--|---|--|
| Stasiak et al. ^[23] (2016) | Randomized Controlled Trial, New Zealand, English | To assess the feasibility of online cognitive behavior therapy (CBT) for children and adolescents with anxiety in the aftermath of a natural disaster | 42 children and adolescents with clinical anxiety referred from primary care were invited to complete an internet CBT program (BRAVE-ONLINE). | Killed 182 | 14–20 months after the earthquake. | Cognitive behavior therapy (CBT) | At the 6-month post-intervention, more than half (55%) of the 33 participants assessed, no longer met the criteria for their primary anxiety disorder. |
| Najarian et al. ^[24] (2004) | Quasi-experimental Study Armenia, English | To describe the activities of the Psychiatric Outreach Program (POP) that initially provided crisis mental health services. | The interventions with children, parents, and teachers | Killed approximately 50,000 people | Not clear | The POP to provide emergency mental health services. | The results of the study demonstrated that the mental health program initially provided service to the victims, and then, training to local professionals. |
| Lee et al. ^[25] (2010) | Descriptive Study, Taiwan, English | To provide counseling, psychoeducation, and health promotion and medical and psychosocial treatment by integration with the home care system | The residents of PuLi town total $n=67,031$ | Unclear | 2 months after a major earthquake | The delivery of mental health programs 2 and 3 months after a major earthquake. | The results of the study demonstrated that the percentage of victims of a disaster who seek help for mental problems may be partially boosted by the implementation of an online service and a community-based aide referral system. |
| Malek Afzali et al. ^[8] (2004) | Descriptive Study, Iran, Persian | To assess the function of rescuers in mental health service delivery to survivors of the Bam earthquake in four steps. | For reaching the purpose, four groups of survivors were selected. | Unclear | 2 weeks after the earthquake. | Mental Health and Psychosocial Support | The results demonstrated that primary care services and transfers have been performed by relatives and domestic people, therefore general training and organizing CBO (community-Based organization) for providing services in disasters will be useful for reducing injuries. |
| Tanaka et al. ^[26] (2020) | Cross-sectional survey, Japan, English | To describe Mental health/disaster education (MHE/DE) at school may promote adolescents' mental health after a disaster. | Participants with traumatic experiences such as injury, loss, or witnessing someone's death/injury and home destruction ($n=1028$). | It left 69 227 people dead | 6 years after the Wenchuan earthquake. | School-based psychoeducation and storytelling | The results showed the experience of storytelling about the disaster to lay supporters, is helpful for long-term psychological recovery, and may be a potential mediating factor for school-based education and better mental health |

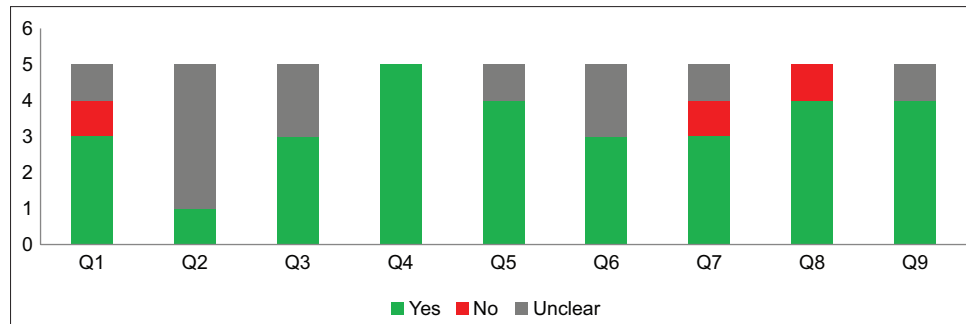


Figure 2: Quality assessment with the JBI Checklist

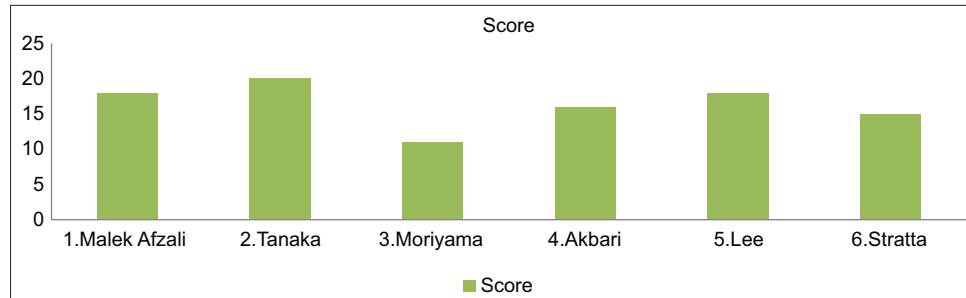


Figure 3: Quality assessment with STROBE Checklist

titles were not relevant. Further, after reviewing the abstracts of the selected articles, 48 studies remained, whose full-text files were studied, and finally, 11 were included [Figure 1]. The reviewed articles were conducted based on quasi-experimental and experimental ($n = 5$) and descriptive designs ($n = 6$). It should be mentioned that a large percentage of the studies were related to the provision of services in the event of multiple disasters and were excluded from the research ($n = 21$). The general characteristics of the included 11 studies to examine the provision of health services in the groups at risk during the occurrence of natural disasters (earthquakes) which were published between 2003 and 2020.

The population in the seven mentioned studies were people living in the earthquake-affected area and about 92% ($n = 10$) were conducted in the English language and more than 90% provided services after the earthquake.

Six of the studies related to the provision of mental health services,^[8,17,19,24-25] three cases of cognitive behavioral intervention,^[18,20,23] one case of rapid needs assessment,^[21] and one case of mental health services and disaster education together.^[26] In addition, two of the studies were conducted in Japan and the rest belonged to other countries including Iran, Italy, Turkey, Taiwan, Nepal, Armenia, and New Zealand [Table 1].

Discussion

The present research was the first systematic review that examined experimental and quasi-experimental,

descriptive studies in the field of providing services during natural earthquakes. It was observed that most of the studies dealt with the provision of mental health services after the earthquake. Considering the distribution of the studies based on the year of publication, the number of studies published in this field has been increasing over the past few years.

The results indicated an improvement in psychosocial performance with a group intervention for children with PTSD symptoms under the supervision of a child and adolescent psychiatrist and a clinical psychologist,^[20] as well as a significant improvement in children's anxiety and mood^[23] and student performance including academic performance, social behavior, and general behavior, as well as facilitating children's natural development and successful adaptive performance.^[18] The mentioned achievements were achieved with the establishment of the mental health team, the combined implementation of psychoeducational modules, and cognitive behavioral intervention for the children suffering from PTSD symptoms and anxiety disorder after the earthquake.

The result of another study conducted on achieving long-term mental health with disaster storytelling and school-based psychological education among students showed that the experience of disaster storytelling for ordinary people may improve long-term psychological benefits.^[26] Further, it may be considered a potential mediating factor for school-based education and better mental health.

In addition, it is necessary to evaluate and improve the responsiveness of the health sector continuously.^[21] Thus, establishing efficient systems for disease control, preventive care, and health education activities is important to face possible future disasters.

Based on the findings, various studies have been conducted on the provision of mental health services for victims with different methods such as raising awareness about mental health care for those affected by natural disasters by distributing pamphlets to promote the reduction of people's emotional stress and reduce the risk of suicide among people experiencing such stress. These pamphlets include the stages including consequences immediately after the earthquake, six months after the earthquake, and one year after the earthquake.^[22]

The provision of mental health services by trained rescuers, the organization of local organizations along with a combined intervention of mental health and disaster preparedness by trained people with the aim of participating in providing services in the event of disasters can be effective in reducing injuries caused by earthquakes,^[8] which results in increasing preparedness, mental health, and community cohesion. The use of focus groups in order to evaluate the impact of the intervention was the main difference between the present review and other reviewed studies.^[17]

One of the important results of the study is the provision of an online service to promote mental health to provide counseling, psychological education, and health promotion intervention with psychosocial integration based on the psychiatric home care system.^[25] On the other hand, providing mental health care with the support of psychologists acted as a filter for more specialized interventions. Mental health interventions after disasters should mobilize people's inner capacity by improving individual and community resilience, strengthening self-control capacity and self-efficacy, and improving community capacity.^[19]

The mental health program initially provided services to the victims and then trained local professionals.^[24] The establishment of the local health team was so important in the results that it needs more attention to mention research priority in study plans.

The present study had two limitations for selecting the articles. In fact, those who provided services about several disasters were excluded from the study due to the different types of disasters and the intrinsic incomparability of the disasters, as well as the articles which were written in languages other than Persian and English. Therefore, language bias may be considered a factor in this study.

Conclusion

The findings of this study indicated that mental health training are more effective if local people are trained to assess the victims based on their mental and psychological status. In this study, the earthquake is an opportunity that allows professionals to discover and introduce intervention combination modules to provide mental health services while helping victims who need emotional support and comfort. However, by considering the amount of trouble caused by the earthquake as a special condition, more attention should be paid to the provision of various types of services, especially in earthquake-prone areas before and after the earthquake, in order to achieve a life with fewer complications and higher quality. The absence of studies in the field of conducting intervention with two intervention and control groups, and as a result, the results of studies in which only intervention was conducted with one group are not comparable, should be considered by research designers and the effective variables should be identified and controlled as much as possible. Further studies are suggested for designing and implementing intervention combination modules to help the victims after the earthquake, as well as the implementation of disaster preparedness programs and the creation of effective databases in earthquake-prone areas before its occurrence.

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Conflicts of interest

There are no conflicts of interest.

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