

REVIEW ARTICLE

Reviewing of Published Studies on Health risk Management in Emergency and Disaster

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Abstract: Background: The need for comprehensive and more serious management of disasters and, consequently, the need for knowledge and how to use it in order to reduce the risk of disasters has increased. The importance of this issue is such that in 2016, the World Health Organization launched a research network related to health risk management in disasters. Accordingly, this study was conducted to review articles published in the field of health in emergency and disaster. Methods: In this study, the narrative review method has been used. The accessible articles published in the field of health Risk Management (health EDRM) from 2000 to 2019 were reviewed. Databases including Web of Science, PubMed, Google Scholar, Science Direct, Scopus, Medline, Magiran and SID were used. 24 studies had the inclusion criteria that were selected and analyzed. Data analysis was a qualitative content analysis in the form of components of health risk management in emergency and disasters. Results: Among the 24 studies reviewed, 21 articles were in English and 3 articles were in Persian. In addition, most of these studies were published in 2019. The articles were analyzed and reported in the form of components and functions of health risk management in emergency and disasters, published in 2019 by the World Health Organization. Conclusion: Studies show that the focus of most studies is on policies, strategies and legislation, planning and coordination, and less attention is paid to the components of risk communication and health services. Also, there are many research gaps and it is suggested that more research be done with more precise guidance.

Keywords: Risk Management; Health; Emergencies; Disasters; Review

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1. Introduction

Every day we face various disasters, in addition to increasing in number, have a certain complexity. This has increased our need for comprehensive and more serious disaster risk management. Management whose most useful tool is knowledge and how to use it and its goal will be the community protection from risk of disasters. For this reason, the importance of this issue has been well considered in many international documents, including the Sendai Document (1), the Sustainable Development Goals (2) and the Paris Climate Agreement (3). For example, the Sendai Framework highlights the important role of "scientific and research institutions and networks" in identifying risk factors for disasters and their risks, and supports increased research for local, regional, and na-

tional programs (4). In addition, in 2016, the World Health Organization (WHO) launched a research network called the WHO Thematic Platform for Health Emergency and Disaster Risk Management Research Network (TPRN) (5).

In fact, with the help of science, a more comprehensive risk assessment can be made to understand the complex nature of the direct and indirect risks of disasters. In addition, systemic science seems to provide the best way to strengthen health partnerships and reduce disaster risk and management (4). Of course, such research requires local and specialized knowledge and understanding of the latest research methods and technologies (6) and has challenges such as lack of standard tools, a comprehensive research program, relationship between science, policy and practice, standard terms and lack of coordination between stakeholders (7). All of this intensifies our need for further study and research. Therefore, in this study, we intend to review the published articles in the field of health risk management in emergencies and disasters, to provide a broader perspective and identify

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research gaps in this area in terms of its components.

2. Methods

In this study, the narrative review method has been used. This qualitative method was formed by this question "How were components and functions of health risk management in emergencies and disasters considered in relevant studies?" The accessible articles published in the field of health Risk Management (health EDRM) from 2000 to 2020 were reviewed. Databases including Web of Science, PubMed, Google Scholar, Science Direct, Scopus, Medline, Magiran and SID were used. The key words of research was checked in title and abstract. They were a combination of health and risk management and disaster or emergency, health risk management and disaster, health risk management and emergency. The search was conducted during September 2020 and retrieved 363 studies. Subsequently, the English and Persian articles in full text were selected. The duplicated and non-relevant articles were excluded. Finally, 24 papers were selected for analysis. Data analysis was a qualitative content analysis in the form of components of health risk management in emergencies and disasters.

3. Results

Among the 24 studies reviewed, 21 articles were in English and 3 articles were in Persian. Also, most of these studies (30%) were published in 2019 (Table 1). The articles were analyzed and reported in the form of components and functions of health risk management in emergencies and disasters, published in 2019 by the WHO (8). These components fall into 10 categories including policies, strategies and legislation, planning and coordination, human resources, financial resources, information and knowledge management, risk communication, health infrastructure and logistics, health and related services, community capacities for health EDRM, and monitoring and evaluation.

4. Discussion

4.1. Policies, strategies and legislation

Health disaster management must be integrated with relevant policies and strategies and supported by legislation. Moreover, these policies and strategies should be able to clearly define the roles and responsibilities of all members in the society (8). Some studies have examined this important issue in the target community (4, 5, 9, 10, 11, 12, 13) and showed changes in policies and strategies were a turning point in risk management views and approaches (9, 14, 15), such as the all-hazard versus multiple hazard approach, and the reactive approach versus the proactive one. Also, the ambiguity in the role and responsibilities of health systems and

other partner organizations in different stages of prevention, preparedness, response and recovery (9) and the need for different strategies compatible with the social and cultural conditions of the society as a principle have been mentioned in some studies (11, 16). In addition, political support for health risk management in emergencies and disasters is also considered as a factor in promoting and developing this process (11, 16). The mode of communicating with politicians is a challenge in this regard (12, 15). Some studies have also suggested that in recent years, health and disaster issues have been promoted in international politics and has become a major issue in the Sendai Document, the Sustainable Development Goals, the Paris Climate Agreement, and the new urban program of the United Nations (4, 10, 11).

4.2. Planning and Coordination

Different types of planning are used to implement health risk management in emergencies and disasters. plans such as the Emergency Operations Plan, the Disaster Reduction Plan, and the Preparedness, Response, and Recovery Plans that must be properly integrated and complemented (8, 10). Many studies have examined it (9, 11, 13, 15, 16, 17, 18, 19, 20, 21) and concluded that there are no comprehensive plans or even appropriate preparedness, response or recovery plans (9, 11, 16, 17, 22). Also, changing and revising plans over different years has been considered as part of their development and evolution (9, 11). In addition, coordination mechanisms are considered as an important component in the management of health risk in emergencies and disasters, which should be provided as soon as possible so that it can be used well during emergencies, especially at the national level (8). On the other hand, Establishing coordination between different departments of many organizations has been considered as time consuming and difficult in some studies (4, 14, 19) and the results of several studies indicate lack of coordination between departments and inter-organizations in disasters (17, 22). Moreover, the existence of coordination mechanisms for the use of international collaborations has been considered in a study (9).

4.3. Human Resources

Special human resources are needed to develop health disaster management strategies as well as related plans and to implement national, regional and local measures. Items such as planning for capacity building, training and human resource development are considered in this component. In fact, the center of effectiveness of health risk management in disasters is the skilled workforce (8, 13) and their availability (15). Studies show that reactive management, shock, etc., have been the mistakes of managers and other relief personals (17). On the other hand, the lack of courses related to health EDRM in school and university curricula, increases

the possibility of such mistakes (5, 9). In addition, several researches have reported that despite the existence of studies related to physical and mental health (5, 15, 23), they have not covered a wide range of topics in this field (15, 23).

4.4. Financial Resources

To develop capacities and implement plans and measures, governments must allocate relevant financial resources and budgets, which have been mentioned in some studies (4, 8, 11). \$26.1 billion is spent annually on health EDRM while the annual costs of disasters are nearly 20 times higher, totaling more than \$500 billion (including the direct economic and indirect social costs of large natural disasters, the costs of smaller disasters, and direct and indirect costs of epidemics) (19). In this regard, it is important to document the economic effects of past disasters on health and the health system, as well as to estimate the costs for future potential emergencies and disasters (8). On the other hand, poverty and lack of appropriate infrastructure will lead to poor access to health care and inefficiency of disaster prevention and response systems (16). Some articles mention the financial resources required to implement health EDRM plans (16, 19, 22).

4.5. Information and knowledge management

Information and knowledge management capacities need to be strengthened to support risk and needs assessments, disease monitoring and surveillance and other early warning systems, and public communications. In addition, mechanisms must be put in place to provide "the right information gets to the right people at the right time" (8). Education has been considered as an important subset of this component in various studies (11, 14, 15, 16, 18, 23, 24, 25) and limited contexts for the transfer of effective knowledge and experience are considered as a challenge (4, 12). In addition, the understanding of risk, the first priority in the Sendai framework, is other issue related to this component which has been considered in several researches (15, 16). The Consensus on definitions and glossaries, regular, purposeful and community-based research, evaluating the effects of research in society and facilitating the ethics process have also reported (5, 6, 12).

4.6. Risk Communication

One of the main functions in disasters is effective communication. This becomes even more important in communication with other sectors, government officials, media and public (8, 15, 25). In one study, the communication process was considered as an important factor for managing expectations (16). In addition, another article suggests that monitoring databases, new tools, and innovation approaches may help identify population health risks and support the development of Health-EDRM policies (15).

4.7. Health and Logistic Infrastructures

Hospital security, health facilities and infrastructure, emergency preparedness and energy efficiency not only protect people's lives, but also enable effective response and recovery, and reduce health care impacts on the climate and environment (8,14, 19). Logistics also includes the accumulation and addition of drugs and equipment, efficient supply chains, and reliable transportation and telecommunication systems (8), which have been considered in some studies (15). The efficiency and effectiveness of warning systems as one of the most important health infrastructures has been studied by some researchers (9, 23, 24).

4.8. Health and Health-related Services

The public health, pre-hospital and advanced treatment departments must be prepared to provide services for responding effectively in an emergency. Measures such as increasing the capacity of beds, establishing temporary facilities or mobile clinics, vaccination, and responding to specific hazards (e.g., isolating infected patients) are in line with this component (8). On the other hand, any weakness in health systems will be a challenge for the effective implementation of disaster risk management strategies (11). For example, barriers to prehospital services in traffic injuries have been investigated in a study (26). What is significant in this regard is taking the right measures in time to increase the efficiency of the disaster response system (10). In addition, whatever the organizational structure of health EDRM, the development of consistent institutions and management methods are essential for good EDRM performance (19).

4.9. Community Capacities for Managing Disasters

Participation of community members in risk assessment can lead to the identification of health risks before their occurrence (8). In addition, community-based interventions significantly increase disaster preparedness (15, 16). On the other hand, the lives of many people can be saved in the first hours after the disasters and before the arrival of the rescue forces by the help of affected people. Furthermore, local people will play a significant role in recovery and reconstruction activities (8). In this regard, some studies have pointed to barriers of community participation and their solutions (12, 19, 27). The participation of people in the community, especially in the case of epidemics, has been considered in some researches which indicate the lack of effective participation (11, 19). Resilience of communities is another new subject in this component which have been reported on its factors, the ways increased or its status in the target community (15, 28).



4.10. Monitoring and Evaluation

Monitoring processes must be integrated into current monitoring systems to achieve key objectives and capacities. For this reason, the existence of standard indicators is necessary (8). In addition, health monitoring systems, such as the syndromic care system, need to be updated to align with WHO strategies. On the other hand, if the evaluation process is integrated in the planning stage, the changes before and after the program will be comparable and monitored more efficiently (16, 18). The need for risk assessment has been considered as one of the basic measures in disaster risk management and its proper and timely implementation has been emphasized (4, 11, 15, 16, 19, 23, 24, 29). In addition, the WHO has supported the IHR (International Health Regulations) core capacity of 100 countries to conduct post-operative surveys, simulation exercises, and joint external evaluations (19).

5. Conclusion

The focus of most studies is on policy components, strategies and legislation, planning and coordination, and less attention has been paid to risk communication and health services. It seems that there are still many research gaps in this area. Issues related to post-disaster conditions such as food safety, occupational status, cost effectiveness as well as the effectiveness of training and behavior change, the mental health of the affected community and staff. In other words, the research areas of health risk management in disasters have not yet been fully developed and implemented. Therefore, it is suggested that applied studies should be conducted to reduce the risks of emergency and disaster in field of health.

6. Appendix

6.1. Acknowledgements

None.

6.2. Conflict of interest

No Conflict of interest.

6.3. Funding and support

None.

6.4. Author contribution

All the authors had the same contribution.

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Table 1: General Characteristics of the studied articles.

NO	Author	Year	Title	Country	Main results
1	Lo et al. (4)	2017	Health Emergency and Disaster Risk Management (Health-EDRM): Developing the Research Field within the Sendai Framework Paradigm	General	- The Sendai Framework provides a useful paradigm within which to shape the research field's strategic development. - Key challenges identified include research overlap, lack of strategic research agenda, absence of consensus regarding terminology, and limited coordination between stakeholders.
2	Kayano et al. (5)	2019	WHO thematic platform for health emergency and disaster risk management research network (TPRN): Report of the Kobe expert meeting	General	- Five major areas for Health EDRM: health data management, psychosocial management, community risk management, health workforce development, and research methods and ethics. - Successful implementation will require further research collaborations through the TPRN initiative, partnerships and resource mobilization.
3	Chan et al. (6)	2019	Health-emergency disaster risk management and research ethics	General	- the health-EDRM approach emphasizes emergency preparedness and disaster risk reduction and can take account of the limitations of the response-focused research landscape
4	Tadesse & Ardalan (9)	2014	Health sector initiatives for disaster risk management in Ethiopia: a narrative review	Ethiopia	- The disaster risk management system in Ethiopia has been changed over time from response, recovery, and rehabilitation to more comprehensive. - Emergency health responses to drought and its ramifications such as acute malnutrition and epidemics have become more comprehensive.
5	Keim (10)	2018	Managing Disaster-Related Health Risk: A Process for Prevention	General	- Effective disaster risk management requires not only management of the immediate problem (disaster-related injuries and disease), but also of the patient's risk factors and of the underlying health determinants. - Key Events in the Development of International Policies for Managing Disaster-Related Health Risk.
6	Olu et al. (11)	2016	Strengthening health disaster risk management in Africa: multi-sectoral and people-centered approaches are required in the post-Hyogo Framework of Action era	Africa	- The African regional strategy for health DRM has operationalized the HFA within the health sectors. - It represents a significant shift from limited emergency preparedness and response action to a more comprehensive disaster risk management approach.
7	Aung et al. (12)	2019	Research methods and ethics in health emergency and disaster risk management: The result of the Kobe expert meeting	General	- Research and ethics requires collaboration between experts, decision-makers, practitioners, and communities in order to facilitate coordinated response when and where it is most needed. - gap areas in the disaster research methodology: impact evaluations; Consensus on the definitions; development of common research statements
8	Tabibi et al. (13)	2019	Validation of Factors Affecting Disasters Risk Management in Iranian Hospitals	Iran	- The factors affecting mitigation in hospitals included planning, rules and regulations, technology and information, and human resources. it is necessary to adopt policies and guidelines. - There was a significant positive relationship between mitigation, response, preparedness, and recovery and accident risk management caused by disasters in hospitals.
9	Khankeh et al. (14)	2019	Developing Accreditation Standards for Disaster Risk Management: An Approach for Hospital Preparedness Improvement-Editorial	Iran	- Changes in policies and strategies - Establishing coordination between different departments of many organizations is very significant. - Effective response and recovery, and reduce health care impacts on the climate and environment.
10	Chan & Lam (15)	2020	Research Frontiers of Health Emergency and Disaster Risk Management: What Do We Know So Far?	General	- Changes in knowledge, research and policy paradigm - Improvement of surveillance databases, new study tools, and innovation methodologies may be helpful. - Using a disturbance management model to estimate logistics constraints
11	Tam et al. (16)	2019	Planning of a health emergency disaster risk management program for a Chinese ethnic minority community	China	- Poverty and lack of infrastructure result in inadequate health care access, disaster prevention and response systems - financial resources required for the health-EDRM program - Lack of disaster preparedness, research focusing on these communities, knowledge regarding the consequences and poor health baseline - Different strategies were needed
12	Nakhaei et al. (17)	2014	Health management in past disasters in Iran: A qualitative study	Iran	exposure shock, non-deliberative relief, lack of comprehensive health disaster plan, lack of preparedness, and poor coordination in health service delivery are important challenges in Health management

Table 1: General Characteristics of the studied articles.

NO	Author	Year	Title	Country	Main results
13	Ahmadi et al. (18)	2012	A Comparative Study of Healthcare Risk Management Program in Selected Countries and Suggesting a Model for Iran	USA, England, Australia	Development of early warning systems, education plan and infection control plan, considering mass casualty event, Blood donation management, improvement of EMS performance
14	Peters et al. (19)	2019	Financing common goods for health: Core government functions in health emergency and disaster risk management	General	- Health EDRM costs are affordable for most Governments - The need for creating adaptive institutions, strengthening capacities of countries, communities and health systems for managing risks of emergencies, using "all-of-society" and "all-of-state institutions" approaches, and applying lessons about rules and regulations, behavioral norms, and organizational structures to better implement health EDRM.
15	Delshad et al. (20)	2015	Early warning system and disaster preparedness in motahari hospital	Iran	- Hospital preparedness was not acceptable and it can increased after the intervention. - Implementation of national hospital preparedness plan and establishment of an early warning system
16	Rajabi et al. (21)	2017	Effects of comprehensive risk management program on the preparedness of rofeide rehabilitation hospital in disasters and incidents	Iran	- The hospital preparedness had an obvious improvement in the areas of command and control, communications, increasing capacity, continuity of vital services, procurement and logistics, and recovery after disasters
17	Khankeh et al. (22)	2011	Disaster health-related challenges and requirements: a grounded theory study in Iran	Iran	- The lack of planning, inadequate organizational management of resources, insufficient coordination in the provision of health services during the disaster, and the manner of participation of international relief efforts were the most important barriers
18	Chan et al. (23)	2019	Scientific evidence on natural disasters and health emergency and disaster risk management in Asian rural-based area	China	- There is a lack of evidence-based health-EDRM interventions. - There is a need in studies of intervention effectiveness, long-term health outcomes, local and cultural relevance and sustainability of health relief.
19	Arab et al. (24)	2019	Developing a hospital disaster risk management evaluation model	Iran	- The proposed HDRME consists of eight constructs, including seven enablers (management and leadership; risk assessment; planning; prevention and mitigation; preparedness; response, and recovery) and one result (key performance results).
20	Olu et al. (25)	2018	What should the African health workforce know about disasters? Proposed competencies for strengthening public health disaster risk management education in Africa	Africa	- The skills and knowledge that African health care workers should possess were divided into six thematic areas: 1) introduction to DRM; 2) operational effectiveness; 3) effective leadership; 4) preparedness and risk reduction; 5) emergency response and 6) post-disaster health system recovery.
21	Alinia et al. (26)	2015	Barriers of pre-hospital services in road traffic injuries in Tehran: the viewpoint of service providers	Iran	- Pre-hospital service barriers in traffic accidents have many dimensions including cultural, structural and managerial domains.
22	Hosseini et al. (27)	2017	Community-Based Management Challenges in Disaster Risk Reduction: A Content Analysis in Iran	Iran	- There are 2 main themes of egocentrism and management helplessness and 5 main categories, including inadequate attention to the nature of the risk reduction process, inadequate community resilience, ignoring social capital, inadequate planning and training, and incorrect organization
23	Ostadtaghizadeh et al. (28)	2016	Community disaster resilience: a qualitative study on Iranian concepts and indicators	Iran	- CDR in Iranian community is formed by various social, managerial, economic, cultural, physical, and environmental domains. - It seems that social and cultural indicators could improve Iranian's CDR more effectively and rapidly
24	Keim (29)	2018	Defining disaster-related health risk: A primer for prevention. Prehospital and disaster medicine	General	- Assessments of health risk have become an integral part of local, state, and national emergency preparedness programs. - A standard nomenclature is needed for communicating disaster-related health risk

