Preparedness and vulnerability reduction for various disasters in the world

Abstract

A disaster is an unusual natural or human-made event or a combination of both, including an event caused by the failure of technological systems, which temporarily affects the human response capacity and affects societies, groups, and individuals. or natural environments causing massive damage, economic loss, disruption, injury, or loss of life.To conduct this review, IranMedex, Magiran, SID, PubMed, Scopus, Science-Direct, Cochrane, and Google Scholar databases were searched and articles related to disasters from 2000 onwards were selected. All articles were in English. The search found 68 articles, after studying them, 35 articles were discarded due to their irrelevance.Disasters can happen anywhere in the world and at any time. Disasters have severe effects on people's life, property, and environment. Research centers and organizations have investigated the phenomena of natural and unnatural disasters and have described and classified them based on different types and definitions. Disasters can be classified into three types: (1) natural (2) man-made (3) combined disastersDisasters are classified into three types: natural, man-made, and combined disasters. Three types of disasters are believed to cover all catastrophic events. No fixed definition of disaster has been accepted. Several criteria have been proposed to define disasters. Understanding the definitions, criteria, and types of disasters will help researchers and organizations in proper classification, good recording, and better analysis of disasters. Disasters have different characteristics and effects. However, disasters have one element in common and that is their intensity.

Keywords: *Disasters, natural disasters, human disasters, modern disasters, disaster preparedness*

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Introduction

In the modern world, disasters are the inevitable fact of our life, avoidable but absolutely unavoidable and part of our life in this complex world of industrialized and civilized world. Disasters are as old as mankind. Disaster is a very broad term that encompasses a range of conditions from an act of terrorism (man-made disaster) to natural disasters such as earthquakes. Developing countries are at high risk of vulnerability to disasters and also face challenges such as poverty, scarce resources, illiteracy, poor infrastructure, corruption, lack of skilled labor and poor knowledge on mental health in disasters. coping with disasters have a significant effect on the physical and mental health of the affected population [1]. In 2003, the Asian Center for Disaster Reduction defined a disaster as: a serious disruption of community functioning, resulting in widespread human, material or environmental damage that exceeds the capacity of the affected community to cope with the use of its own resources[2]. Human activities, especially in the last two centuries, through industrialization and land use change, have had a major impact on the environment and landscape, which has brought about climate change, deforestation, desertification, land degradation, and air and water pollution.These effects are strongly related to the occurrence of geomorphological hazards such as floods, landslides, snow avalanches, soil erosion, etc., each of which can cause a disaster or disaster in its own way [3]. The occurrence of any kind of disaster can cause a lot of financial and human losses for a society [4]. Research centers and institutions sometimes describe disasters in different terms, although disasters are classified as natural, unnatural or man-made, purely social, technological and hybrid. However, it has been found that disasters can be classified into three types: natural, man-made and mixed. (Table 1). Natural disasters are catastrophic events caused by natural factors such as volcanic eruptions, tornadoes, earthquakes, etc., over which humans have no control. Natural disasters are often called "acts of God" [5, 6].

Types of disasters		disaster
natural	Phenomena that occur under the surface of the earth	Earthquake
		tsunami
		volcano eruption
	Geological phenomena	landslide
		Avalanche
	Weather phenomena	Types of storms
		Tornado
		snow and hail
		Sea Flooding
		Flood
		Drought
		Heat and cold waves
	Biological phenomena	Infections
		Epidemics
Manmade	Socio technological	fire
		Types of explosions
		Leakage of toxic substances
		Types of pollution
		Stock market disorder
	Transport (accidents)	by air
		terrestrial
		marine
	Destruction of buildings and public places	Deliberate arson
		Crowd gathering
		The collapse of the skeleton of buildings
	Lack of facilities	Disruption in computers
		Disruption of important devices
	Types of wars (traditional, modern, internal and international)	War between ethnic groups within countries
		Civil protests
		Bombing
		War between two countries
		Siege of the country
		Nuclear, chemical, microbial warfare
Hybrid	Natural and man-made	Construction in rivers
		Construction in the place of an active volcano or an avalanche
		Landslide

Table(1): Types of disasters

The World Health Organization considers accidents and disasters as situations where the local equipment and tools necessary to protect human life have been lost due to natural or man-made disasters.In the last two decades, major natural disasters in the world have affected the lives of at least 800 million people and caused thousands of deaths and economic losses exceeding 50 billion dollars.On the other hand, due to the increase in population density in different regions of the globe, human settlement has increased in disaster-prone areas. Statistically, every year, more than 128,000 people around the

world die due to natural disasters. According to the report of the World Health Organization in 2008, the impact of accidents and disasters on the world community is very great, because on average, about 500 natural accidents are recorded every year around the world, which lead to the damage of about 80 million people, injuries of 74,000 people, and the death of 50,000 people. And 5 million people have been displaced from their place of residence. The slogan of the World Health Organization in 2009 was "Health in Disasters and Disasters" and this organization has committed all its member countries to plan, manage, coordinate, train and other necessary actions in line with this slogan, with great emphasis on support and capacity. People building and local management [7]. In order to reduce the global negative effects of natural hazards, various strategies have been implemented. For example, the United Nations launched the International Decade for Natural Disaster Reduction (IDNDR) in 1989. The Yokohama Strategy and Plan of Action for a Safe World were presented at the first World Conference on Natural Disaster Reduction in 1994. In 2000, the International Strategy for Disaster Reduction (ISDR) and a coordination secretariat was created by the United Nations (UNISDR). The Hyogo Action Plan for National and Local Disaster Resilience was proposed at the Second World Conference on Disaster Risk Reduction in 2005. The Sendai Framework for Disaster Risk Reduction 2015-2030 was proposed at the Third World Conference on Disaster Risk Reduction in 2015. , which identified four priority areas: 1) understanding disaster risk; 2) Strengthen disaster risk prevention for disaster risk management. 3) Invest in disaster risk reduction to improve resilience. 4) Strengthen disaster preparedness to respond effectively and promote better resettlement and recovery in disaster-affected areas. The 2019 Global Assessment Report released by UNISDR further emphasized the integration of disaster risk reduction, climate change response and the New Urban Agenda into the overall framework of the United Nations Sustainable Development Goals to promote risk-aware sustainable development. In addition to the United Nations, other international organizations have devoted much effort to international research programs since the 21st century. For example, in 2010, a decade-long research program, the Integrated Research on Disaster Risk (IRDR) was established by the sponsors of the International Council of Science and the United Nations Office for Disaster Risk Reduction (UNDRR) to address the challenges . which arise. of natural hazards, to reduce their effects and to improve the related policy mechanisms of a global and multidisciplinary approach[8]. With the application of new technologies, advances in disaster risk assessment, forecasting, monitoring and early warning, the capacity to manage and mitigate disaster risk has improved significantly. The number of victims caused by natural hazards is decreasing every year, as is the ratio of economic losses to GDP. However, climate change and extreme weather events have significantly increased the intensity and frequency of natural hazards. In addition, urbanization, population growth, and economic development and use of land resources also increase disaster risks. Therefore, the study of natural hazards and disaster risks will be important to protect our standard of living and our economy[9]. In recent years, remarkable achievements have been made in disaster prevention and mitigation, and associated risks and losses have been significantly reduced. Progress has been made in the design and construction of landslide and other geological disaster prevention systems[10]. Meanwhile, green and environmentally friendly mitigation technologies have become a trend [11]. A variety of new materials, structures and methods have been adopted, which also have disaster prevention and control capabilities [12]. Currently, disaster prevention and control projects still rely on engineering measures. But the design and layout of engineering measures often do not adequately consider the effects of climate change, vegetation, ecology and other environmental factors[13].

method:

In this review, data were searched through IranMedex, Magiran, SID, PubMed, Scopus, Science-Direct, Cochrane, and Google Scholar databases, and articles related to disasters from 2000 onwards were selected. The keywords that were used for a better search are: disasters, natural disasters, human disasters, modern disasters, disaster preparedness. The language of all articles was English. In this search, 73 articles were found, after studying them, 39 articles and book were discarded due to their irrelevance. The inclusion criteria included all studies that were published in connection with various types of disasters and preparedness against them.

findings:

Disasters are special conditions and their management requires the cooperation of all the people involved in the crisis and calamity, and that is why today the international motto of preparedness against unexpected events is at the top of the national and international disaster management programs, especially in disaster-prone countries [14]. Between 2008 and 2018, 3,751 natural disasters occurred worldwide. The total number of these natural disasters, 84% of which were weather-related, claimed the lives of two billion people and caused $1,658 billion in damage. Natural disasters, including earthquakes, tsunamis, tornadoes, and hurricanes, are traumatic events that affect the lives of many people at once. Many people suffer during disasters, with refugees, the elderly and women suffering the most. Although older people are not accident-prone, age-related factors, including limited mobility and chronic illnesses, can increase the risk. natural disasters can adversely affect the elderly. In fact, many studies have

shown that the elderly are among the most vulnerable to natural disasters [15]. In addition, leaders and decision makers at all levels are required to conduct frequent exercises to increase the effectiveness of disaster response and effective use of resources in order to minimize casualties. For people, prevention and response to disasters at different levels, a general understanding of the concepts and techniques of disaster prevention is important [16]. The results of Mohebi Far et al.'s research show that in most countries of the world, especially developed countries, disaster management activities are carried out in four stages; Anticipation and prevention, preparation, confrontation, reconstruction take place. And different countries have paid attention to all or some of the stages according to their knowledge and economic power. The findings showed that in terms of the importance of disaster management programs and due to the need for coordination between ministries and different organizations and the importance of funding and the need to declare an emergency and extraordinary state in some situations, this management in most countries is under the supervision of the highest authority. executive of the country and in the form of the Supreme Council or a part of the government or at the level of a ministry or a separate organization is at the highest executive level of the country[17]. Increasing knowledge of disaster prevention and response has required local governments to assess and analyze potential disaster risks with a focus on emergency planning in disaster-prone areas. People responsible for disaster management in each region are required to improve the information methods of prevention and response in disasters and increase the efficiency of operation and warning of regional response centers[18]. Disaster risk factors that are usually mentioned include the following: vulnerable rural livelihoods, weak local and urban governance, ecosystem decline and climate change, which climate change are metafactors (intermediary factors). Because it also puts other factors under the radius. Other examples include: rapid urbanization without proper planning, the development of trade in agricultural products and their sale (which often occurs with increasing urbanization and environmental degradation), and the most important condition that is addressed is poverty [19]. Pouran Fard and Sadeghian stated in a research in 2019 that to prepare for all kinds of disasters, vital and important places and buildings should be strengthened and protected in terms of functionality, structural and non-structural [20]. Also, in order to increase preparedness against disasters, measures such as training people, planning, forming a disaster task force, training and maneuvers are necessary, and having a successful crisis management system can be one of the most important factors in reducing An increase in casualties in the event of natural disasters. Among the various components of crisis management in dealing with accidents and unforeseen events, healthcare and medical systems, especially hospitals, play the most important role. Therefore, proper preparation to deal with disasters is very important[21]. Natural and man-made disasters cause serious disruption in society and cause many human, financial, environmental, social and economic losses beyond society's control [22]. Considering that emergencies and natural disasters with their devastating effects are occurring more and more frequently all over the world, the acquisition of preparedness knowledge and its use is considered the most effective way to prevent disasters or to reduce their consequences through technological advances [23] . Although the vulnerability of some communities and individuals to natural and man-made disasters is inevitable, people can play a role in reducing these disasters by changing system resilience and disaster recovery capacity[24-26]. Disasters can be prevented, and disaster risk reduction measures such as Actions such as increasing shelter resilience to hazards can reduce disaster damage and thereby improve recovery. In addition, it is more effective when people in the community work well together in allocating resources and performing appropriate disaster recovery [27-29]. The purpose of Disaster Education for Vulnerable People is to provide individuals and groups with the knowledge, skills and motivation to take action to reduce their vulnerability to disasters. Even educating vulnerable people is effective action for other people or communities [30-34]

Discuss:

Many studies show that communities with educated people are better prepared and able to respond to disasters. Furthermore, some have pointed out that disaster education is a practical, operational, and cost-effective tool for risk management [35]. Furthermore, others have confirmed that low risk awareness and lack of understanding negatively impact people's preparedness, response to risk warnings, personal protective measures, and recovery [36]. The HUGO Action Framework highlights five operational priorities for global disaster risk reduction. A third functional priority was to apply knowledge, innovation and training to create a culture of security and resilience at all levels. According to this framework, disasters are naturally reduced when people are well informed and motivated to build a culture of preparedness and resilience. In this regard, priority should be given to the collection and dissemination of knowledge and information on risks, vulnerabilities and capabilities, especially vulnerable people. Also, it is important to mention that those who are vulnerable due to restrictions or conditions require special training and attention with the help of trained professionals. [37, 38]. Due to the fact that natural disasters and accidents are mostly not preventable, it is necessary to increase the preparedness of various systems and organizations, especially vital organizations, to reduce deaths and injuries caused by them.

Preparedness generally includes having a plan, facilities, and personnel in place to provide an effective response at the appropriate time. Preparedness requires financial and management support within the organization as well as other partner organizations in order to plan for an effective response. In some cases, the centers are directly affected by the accident and are damaged in terms of structural, non-structural, equipment, personnel and even organization and management, and therefore they will not be able to provide services to people caused by accidents and disasters [7]. To increase preparedness, education should be better seen as a part of emergency response, because education will strengthen disaster preparedness[39].

Conclusion:

definitions of disaster; Understanding criteria and categories helps researchers and organizations make appropriate classifications; It will help researchers and organizations better document and analyze risk data. Disasters can be divided into three categories (natural, man-made and synthetic) - these three categories are believed to cover all catastrophic events. Although disasters have different characteristics and effects, they have one common element, which is their severity. A fixed definition of a natural disaster is accepted anywhere in the world, and many criteria have been proposed to define disasters in order to reduce the effects of disasters on society and people.

Conflict of interest

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Ethics statement

None.

References

1. Math SB, Nirmala MC, Moirangthem S, Kumar NC. 2015 Jul-Sep; Disaster Management: Mental Health Perspective. Indian J Psychol Med. 37(3):261-71.
2. Center, A.D.R. 2003 [cited 2003 april]; Glossary on natural disasters. Available from: www.adrc. or.jp.
3. Alcántara I. and A.S. Goudie, 2010: Geomorphological hazards and disaster prevention. Cambridge University Press.
4. Alhazmi, O.H. and Y.K. . 2013. Malaiya. Evaluating disaster recovery plans using the cloud. in 2013 proceedings annual reliability and maintainability symposium (rams). IEEE..
5. Horney, J.A., et al., 2003-2015 ,The Impact of Natural Disasters on Suicide in the United States. Crisis, 2021. 42(5): p. 328-334.
6. Disasters, C.f.R.o.t.E.o. 2010; January. The OFDA/CRED International Disasters Database.:[Available from: www.cred.be/emdat/disdat2.htm
7. Khankeh, H. and co-authors, 1398, disaster hospital preparedness. Vol. 1. tehran: University of Welfare and Rehabilitation Sciences. 20-25..
8. An, H., C. Ouyang, and D. Wang, 2021. A new two-phase flow model based on coupling of the depth-integrated continuum method and discrete element method. Computers & Geosciences, 146: p. 104640..
9. Yang, X. and P. Huang, 2021, Restored relationship between ENSO and Indian summer monsoon rainfall around 1999/2000. The Innovation,2(2): p. 100102.
10. Tang, H., J. Wasowski, and C.H. Juang, 2019, Geohazards in the three Gorges Reservoir Area, China–Lessons learned from decades of research. Engineering Geology. 261: p. 105267.
11. Huang, Y., et al. 2020, Nature based solutions for urban pluvial flood risk management. Wiley Interdisciplinary Reviews: Water. 7(3): p. e1421.
12. Xue, Y., et al., 2021 ,China starts the world's hardest "Sky-High Road" project: Challenges and countermeasures for Sichuan-Tibet railway. The Innovation. 2(2).
13. Pourvakhshoori, N., et al. 2017 ,Nursing in disasters: A review of existing models. Int Emerg Nurs. 31: p. 58-63.
14. van der Merwe, M., et al., 2017, Dynamic rerouting of vehicles during cooperative wildfire response operations. Annals of Operations Research. 254(1): p. 467-480.
15. Pruchno, R., et al , 2020,Type of Disaster Exposure Affects Functional Limitations of Older People 6 Years Later. J Gerontol A Biol Sci Med Sci. 75(11): p. 2139-2146.
16. Sena, L. and K. 2006, Woldemichael, Disaster prevention and preparedness. 1: p. 1-80.
17. Mohebifar, R., s. Tabibi , and S. Asefzadeh, 1387, Designing A Structure Of Disaster Management For Iran.. 11(33): p.47-56.
18. Chou, J.-S., K.-H. Yang, and T.-C. Ren, 2015, Ex-post evaluation of preparedness education in disaster prevention, mitigation and response. International Journal of Disaster Risk Reduction. 12: p. 188-201.
19. Gordy , m., 2016, disater risk reduction and the global system. Vol. 1., tehran: azargan. 6-7.
20. PouranFard, J., et al. . 2019, Assessing the readiness of hospitals in Kohgiluyeh and Boyerahmad provinces against disasters based on HIS. 9(S2): p. 109.
21. PouranFard, J. and S. Heidari,2019, Investigating the Preparedness of Hospitals of Gachsaran City in Disasters in2018. J Biochem Tech Special Issue (2): 132-137
22. Council, N.R., 2011, National earthquake resilience: research, implementation, and outreach: National Academies Press.
23. Adiyoso, W., H.J.D.M.o.C.H. Kanegae, and H. Cities,2001,The effect of different disaster education programs on tsunami preparedness among schoolchildren in Aceh, Indonesia. 2. 6(1): p. 165-172.
24. Aldrich, N. and W.F.J.P.c.d. Benson, 2008, Peer reviewed: disaster preparedness and the chronic disease needs of vulnerable older adults. 5(1).
25. Morris, K.-A.N., M.T.J.C.Y. Edwards, and Environments, . 2008,Disaster risk reduction and vulnerable populations in Jamaica: Protecting children within the comprehensive disaster management framework. 18(1): p. 389-407.
26. Tuladhar, G., et al., . 2015, Assessment of disaster risk reduction knowledge of school teachers in Nepal. 3(1): p. 20.
27. Collymore, J.J.E.H., 2011, Disaster management in the Caribbean: Perspectives on institutional capacity reform and development.. 10(1): p. 6-22.
28. Izadkhah, Y.O. and M. Hosseini. 2007, Disaster preparedness strategy through earthquake education and training of classified target groups. in Proceedings of The 2nd International Conference on Integrated Natural Disaster Management (INDM), Tehran. Citeseer.
29. Muzenda-Mudavanhu, C., B. Manyena, and A.E.J.N.H. Collins, .2016,Disaster risk reduction knowledge among children in Muzarabani District, Zimbabwe. 84(2): p. 911-931.

30. Bosschaart, A., et al. 2016, Evaluating a flood-risk education program in the Netherlands. 50: p. 53-61.
31. Brodie, M., et al., 2006, Experiences of Hurricane Katrina evacuees in Houston shelters: Implications for future planning. 96(8): p. 1402-1408.
32. Morrow, B.H.J.D. 1999, Identifying and mapping community vulnerability. 23(1): p. 1-18.
33. Kagawa, F. and D.J.J.o.E.f.S.D. Selby, 2012, Ready for the storm: Education for disaster risk reduction and climate change adaptation and mitigation1. 6(2): p. 207-217.
34. Rohrmann, B. Risk perception, risk attitude, 2008, risk communication, risk management: A conceptual appraisal. in 15th Internaional Emergency Management Society (TIEMS) Annual Conference..
35. Center, A.D.P.J.A.D.P.C., Bangkok, 2011, A study on impact of disasters on the education sector in Cambodia. 2008.
36. UNICEF, Disaster risk reduction and education: United Nations Children's Fund.
37. Muttarak, R., W.J.E. Pothisiri, and Society, 2013, The role of education on disaster preparedness: case study of 2012 Indian Ocean earthquakes on Thailand's Andaman Coast. 18(4).
38. Rundmo, T. and T.J.S.s. Nordfjærn, 2017, Does risk perception really exist. 93: p. 230-240.
39. Halman, P.G., et al. 2018,The humanitarian imperative for education in disaster response. Disaster Prevention and Management: An International Journal. 27(2): p. 207-214.