

Domains and Indicators of Resilient Children in Natural Disasters: A Systematic Literature Review

Abstract

Resilience has received increased attention among both practitioners and scholars in recent years. Child resilience has received notable attention in disaster risk reduction (DRR) during the creation of the Sendai Framework 2015–2030 to improve child protection in the event of disasters. As resilience is a subjective concept with a variety of definitions, this study evaluates its different factors and determinants in the existing research to clarify the path for the near future and objective research. A systematic literature review was conducted by searching and selecting the peer-reviewed papers published in four main international electronic databases including PubMed, SCOPUS, WEB OF SCIENCE, and PsycINFO to answer the research question: “What are the criteria, factors or indicators for child resilience in the context of a natural disaster?” The process was based on PRISMA guidelines. In total, 28 papers out of 1838 were selected and evaluated using thematic analysis. The results are shown in two separate tables: one descriptive and the other analytical. Two main themes and five subthemes for criteria for child resilience in a disaster have been found. The factors found cover the following areas: mental health, spiritual health, physical, social behavior, and ecological, and as well as environmental. The majority of the included studies mentioned the scattered criteria about children resilience without any organized category. Although this concept is multifactorial, additional research is needed to develop this study and also observe other kinds of disasters such as human-made disasters.

Keywords: Adolescent, children, disaster risk reduction, natural disaster, resilience

Introduction

Many countries in the world are constantly experiencing disasters of different kinds. Each year, children as the large group in the population are severely affected by these.^[1–5] For instance, based on findings by the United Nations International Children’s Emergency Fund in 2007, approximately 200 million children experienced physical disabilities due to disasters (or physical injuries due to disasters) in the world.^[6] Many studies have already focused on the vulnerability of children in disasters,^[7–10] but little is to be found regarding children’s capacity in a disaster situation. Recently, children have played a significant role in disaster risk reduction (DRR) during floods in Bangladesh^[3] and actively participating in the Third United Nations World Conference on DRR (WCDDR),^[11] but their voice has rarely been heard in DRR.^[1] However, youth and adolescents have the capacity to make a contribution in the fields of science, practice, and innovation.^[11]

Furthermore, the Hyogo Framework for Action (2005–2015) emphasized preparedness and education to build resilience and a safety culture at all levels,^[12,13] and the Sendai Framework DRR (2015–2030) has focused on youth participation and activities in DRR, and their feedback is seen as an important resource.^[11] Accordingly, knowing the capacity and resiliency of children is essential in DRR. Resilience is a multifactorial term which has been given several definitions in different fields such as health and psychology.^[14–16] According to the researchers’ claim, use of the term resilience in the scientific literature has increased eight times more than the previous years,^[17] and it also has increased in policy making as well as in practice.^[18]

Research has shown that while there are a lot of studies about psychological resilience in children,^[19–22] little is known about the integrated domains and the criteria for this resilience, particularly in disasters. Furthermore, the available studies did

Leila Mohammadinia^{1,2}, Ali Ardalan^{1,3}, Davoud Khorasani-Zavareh^{4,5,6}, Abbas Ebadi⁷, Hossein Malekafzali⁸, Mojtaba Fazel⁹

¹Department of Disaster Public Health, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran, ²Department of Health in Disasters and Emergencies, School of Management and Information Sciences, Shiraz University of Medical Sciences, Shiraz, Iran, ³Harvard Humanitarian Initiative, Harvard University, Cambridge, MA, USA, ⁴Safety Promotion and Injury Prevention Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran, ⁵Department of Health in Disasters and Emergencies, School of Health, Safety and Environment, Shahid Beheshti University of Medical Sciences, Tehran, Iran, ⁶Department of Clinical Science and Education Karolinska Institute, Stockholm, Sweden, ⁷Behavioral Sciences Research Center, Life Style Institute, Faculty of Nursing, Baqiyatallah University of Medical Sciences, Teheran, Iran, ⁸Department of Health Promotion, Islamic Republic of Iran Medical Academy, Tehran, Iran, ⁹Nephrology Research Center, Tehran University of Medical Sciences, Tehran, Iran

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Mohammadinia L, Ardalan A, Khorasani-Zavareh D, Ebadi A, Malekafzali H, Fazel M. Domains and indicators of resilient children in natural disasters: A systematic literature review. *Int J Prev Med* 2018;9:54.

Access this article online

Website:
www.ijpvmjournal.net/www.ijpvm.ir

DOI:
10.4103/ijpvm.IJPVM_1_18

Quick Response Code:



Archive of SID

Address for correspondence: Dr. Davoud Khorasani-Zavareh,

Safety Promotion and Injury Prevention Research Center, Department of Health, Safety and Environment, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

E-mail: davoud.khorasani@gmail.com

not provide any logical model for child resilience. On the other hand, the definitions of resilience are as various as the diversity of the fields. The term “resilience” comes from the field of psychology which is rich in explanations, but resilience is new in research about disasters and DRR. Furthermore, the criteria and domains of resilience have been limited mainly to the psychosocial field. In this study, the Newman and Tango (2012) definition of resilience is used: the “individual ability to adapt to the tragedy, trauma, adversity, hardship, and ongoing significant life stressors and also to anticipate, tolerate and bounce back from external shocks, and pressures in their life to avoid more vulnerability”.^[23,24] In fact, assessing the resilience criteria is essential to identify children’s capacities and capabilities.^[25] To the best of our knowledge, no systematic approach has been found to child resilience, hence, this systematic literature review has been conducted to determine the criteria and domain of children’s resilience in disasters, to define their capacity and ability. The study results can be useful for decision-makers, policymakers, and also for those who are responsible for children’s safety in communities.

Methods

Strategy of systematic review

This study was a systematic literature review, which has registered on the PROSPERO website.^[26] The study was developed based on the Preferred Reporting Items for Systematic Reviews and Meta-Data Analysis (PRISMA) guidelines.^[27] It started with these research questions: “What are the elements, criteria, and capacity of children in the context of a natural disaster?” “what would be the resilient children criteria on which we can rely in disasters?” It should be mentioned that the definition of children was based on that of the UNICEF: “a child means every human being under 18-years-old.”^[28]

Data sources

A systematic search took place during a 3-month period from June 14, 2016 to August 4, 2016. The sources consisted of PubMed, SCOPUS, WEB OF SCIENCE, and PsycINFO. There was no time limitation for included articles. To find gray literature, special databases such as UNICEF, ERIC, UNISDR, APA PsycNET, Global Platform on DRR, and International Building Resilience Conference were searched. All kinds of available electronic resources were included such as books, international reports, and workshops related to the research question.

Database searching

The initial search process was conducted to find an answer to the research objectives with no limitation on

language and time period. The MeSH index was used to find keywords. Furthermore, experts were consulted and the related articles were examined. Each database had its own syntax for searching, for example, search terms for PubMed were Resilient* and [Child* or youth or adolescent* or young or teen*] disaster, title, abstract, headwords, table of contents, key concepts, original title, tests, and measures).

Data extraction

All search results were imported into EndNote basic software version 15, which is free source. Initially, duplicated articles were removed in the study. Then the articles evaluation was started using title, abstract, and keywords as the inclusion criteria. Following that, the full texts of the remaining peer-reviewed articles were evaluated considering the inclusion and exclusion criteria and standard quality assessment.^[29-31]

Inclusion and exclusion criteria

The inclusion criteria included any studies pertaining to human resiliency, children, and natural disasters. It has been guided to find out “what are the children resilience criteria and the potential capacity of children in natural disasters?” among final selected peer-reviewed articles by content analysis approach. As exclusion criteria, the articles which were about human-made disasters, emergencies, clinical issues, vulnerability, post-traumatic stress disorder, people more than 18-year-old, community resilience, and nonhuman resilience were removed in this study [Figure 1].

Results

In the process of this systematic literature review data analysis, the findings were divided into two groups: descriptive and analytical. Finally, based on the factors, a logical model for child resilience in disasters was created by the authors.

In the descriptive group, 1838 potentially relevant results were included from the electronic database including PubMed, Scopus, the web of science, PsycINFO, and gray literature (UNICEF, ERIC, and Conference) since 14th June till 4th August 2016. After that, 301 duplicated records were discarded and the 1537 remaining ones were reviewed; 1351 were excluded because of nonrelevant title and abstract. Then, the eligibility of the 186 articles was considered, and the documents were discarded which were not about children, natural disaster, resilience, or vulnerability issues. Moreover, 65 documents and 3 relevant articles from the articles’ references were added. Finally, a full-text review of these articles led to

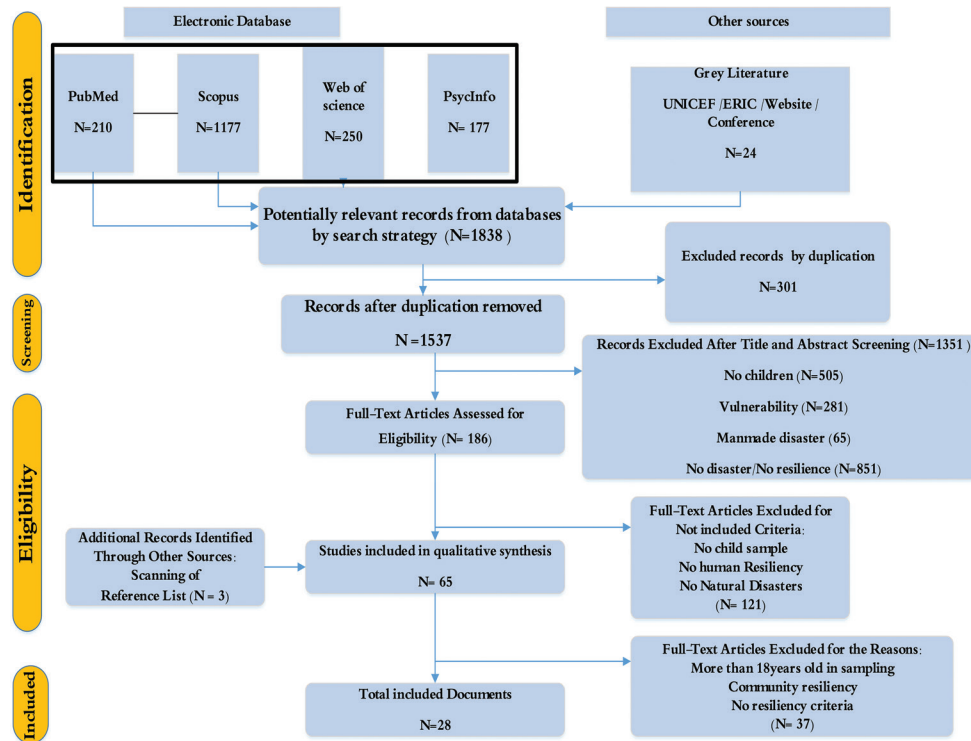


Figure 1: The Flow diagram of the search and paper selection

28 documents, which were peer-reviewed articles, books, theses, and conference articles, which were included in the analysis [Table 1]. The selected peer-reviewed articles were carefully evaluated to find child resilience criteria based on content analysis as an analytical part, which led to 600 codes. The categories of the finding criteria were organized in three domains as the theme, subtheme, and code. After several meetings and discussions between co-authors, an agreement was reached on categories; and the adjusted table was created with two main themes and five sub-themes [Table 2].

As shown in Table 1, among 28 final documents including peer-reviewed articles, thesis, and conference papers, it showed that although the interest in research about resilience for children began in 1990;^[32] the attention to this topic has increased in recent years. All 28 studies were conducted in the context of different types of natural disaster covering landslides, floods, earthquakes, tsunamis, drought, hurricane, and climate change. The most common contexts of those studies were not only communities and societies but also schools, family, and camps, which were also of considerable interest for researchers. Table 1 indicates the descriptive results of the included peer-reviewed articles [Tables 1 and 2].

Furthermore, as latent content analysis, the 28 evaluated peer-reviewed articles were about natural disasters, DRR issues, factors, or domains of child resiliency. The peer-reviewed articles were coded separately, and in total, 600 codes about resiliency were found. Those codes were

evaluated and organized based on the WHO definition of health in 1948 “a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity”.^[33] Table 2 presents the categorization of the child resilience criteria.

The research findings were categorized into two groups: internal (personal characteristics) and external (social behavior) factors. The internal factors consisted of mental health, spiritual health, and physical factors. Furthermore, the external factors included social behavior, ecological factors, and environmental factors.

A logical model is presented to show factors that affect child resilience in a disaster [Figures 1 and 2].

Discussion

This systematic literature review has been conducted to determine the criteria and domains of children’s resilience in disasters. Moreover, it is conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Data analysis guidelines.^[27] In this research, the most important findings are the development of a conceptual model called LM-CRID for children’s resilience in disasters. The second findings denote the two groups: descriptive and analytical categories.

Based on the descriptive findings, the 28 final peer-reviewed articles were extracted including comprehensive criteria about children’s resilience in DRR. In the analytical section, the extracted classifications are mentioned as internal and external criteria. Of the studies of children in disasters,

Table 1: Analyzed peer-reviewed articles details for systematic literature review

Row	Author	Year	Country	Study objective	Type of disaster	Reference type	setting/place (school, home, community)
1	Acosta	2015	USA	The purpose of this brief report was to describe the development of a YRC (i.e., a set of tools to engage young people in youth-led community resilience activities) and the findings from a small-scale pilot test	DRR	Journal article	Community
2	Bandrova	2015	Bulgaria	This paper aims to present the conceptual framework of a project for establishing an EDC "Save the children's life" at UACEG, providing relevant justification of the necessity to organize such a center in Bulgaria and discussing good practices in Europe and worldwide for children's education and training in case of disastrous event	Different type of natural disaster (landslides, floods, earthquakes, snowstorms, windstorms, ice storms, drought)	Conference proceeding	School
3	Bhattacharya	2013	Sendai, Japan	This paper discusses the term resilience from a number of different perspectives considering multiple challenges of the current time: climate change, energy crisis, economic instability, natural disasters, and social transformation. In this paper, the author digs deeper into the factors associated with resilience and different approaches to learning resilience	DRR	Conference proceeding	Community
4	Cénat	2014	France	This study aims to investigate psychometric properties and the underlying structure of the Creole version of the RS among children and adolescent survivors of the 2010 Haitian earthquake	Earthquake	Journal article	Schools and street children
5	Cumiskey	2015	UN	This article summarizes and analyzes the children and youth forum and youth participation in the process during and leading up to the WCDRR in 2015	DRR	Journal article	Community
6	de Milliano	2015	The Netherlands	The key objective of this article is to identify what factors enable adolescents to be resilient to flooding and to explore to what extent and why these factors are generic or context-specific	Flood	Journal article	Community
7	Dean	2007	Australia	This study addressed two questions: Does severe and prolonged drought impact on the emotional health of rural and remote children and What may be done to mediate any identified impacts of severe and prolonged drought on rural children, young people and their families?	Drought	Journal article	School and community
8	Feitelberg	2007	US	This study sought to understand the correlates of resilience and post-traumatic stress responses in children 20 months following a devastating hurricane in Grand Cayman, British West Indies	Hurricane	Thesis	School and home
9	Fu	2013	British West Indies	This study sought to understand the correlates of resilience and post-traumatic stress responses in children 20 months after a devastating hurricane in Grand Cayman, British West Indies	Earthquake	Journal article	Public schools and temporary camps

Contd...

www.SID.ir

Table 1: Contd...

Row	Author	Year	Country	Study objective	Type of disaster	Reference type	setting/place (school, home, community)
10	Fu	2014	China	This study conducts a psychometric assessment of the CD-RISC and the measure's validity among children and adolescent survivors to identify the factors associated with resilience in this sociocultural setting	Earthquake	Journal article	School
11	Fu	2012	China	This dissertation builds on an evaluation that was conducted at the end of a psychosocial intervention that was implemented to improve mental health and foster resilience among child and adolescent survivors after the 2008 Sichuan, China earthquake	Earthquake	Thesis	School
12	Grotberg	2001	USA	The long-term objectives of the IRRP were to indicate: a. How children become resilient and b. How service providers incorporate the promotion of resilience into their programs	Disasters	Journal article	Community
13	Guilera	2015	Spain	This study analyzes the psychometric properties of the ARQ	-	Journal article	community
14	Hestyanti	2006	Indonesia	This exploratory study investigates factors contributing to resilience of children in the age group of 11–15 years, survivors of the 2004 tsunami in Aceh, Indonesia, through qualitative methodology	Tsunami	Conference paper	Camps
15	Martin	2010	Bangladesh	The article begins with a review of the literature published on the CLDRR approach and describes the key issues. Then, it identifies the effects of floods on children in Bangladesh and analyses the traditional coping mechanisms developed by communities, highlighting where they could be improved	Flood	Journal article	School
16	Martinez Garcia	2016	Spain	The goal was to identify physical and mental vulnerabilities and risk factors as well as capacities or resilience factors of children in the face of EWDDs, as a contribution to informing preventive and adaptive policy and intervention	EWE	Journal article	Community
17	Masten	1990	USA	This article reviews the research on resilience to delineate its significance and potential for understanding normal development	-	Journal article	Community
18	Mitchell	2014	UN	This article argues that mainstreaming children's needs and capacities into broader adaptation efforts can lead to more sustainable outcomes that can help to build long-term, community-level adaptive capacity	Climate change	Journal Article	Community
19	Mudavanhu	2015	Bindura, Zimbabwe	The purpose of this study is to explore children's vulnerabilities and their role in DRR to give them a voice	DRR	Journal article	Community
20	Piangiamore	2015	Italy	This paper describes activities run for the past 10 years at schools and science venues, focusing on the effectiveness of the learning approach, the dissemination strategy and the potential to raise awareness of the natural hazards	Natural hazards	Article	School

Contd...

Table 1: Contd...

Row	Author	Year	Country	Study objective	Type of disaster	Reference type	setting/place (school, home, community)
21	Prince-Embury	2013	New York, US	This comprehensive volume clarifies core constructs of resilience and links these definitions to effective assessment	Disasters	Book section	School and Community
22	Ratrin Hestyanti	2016	Indonesia	This study aimed to identify the concept of resiliency in the acehnese community, identify resilient children among child survivors, and examine factors contributing to child resiliency	Tsunami	Journal article	Camps
23	Sapienza	2011	US	This review highlights recent theory, findings, and implications of resilience research on young people	-	Journal Article	Community
24	Terranova	2015	Mississippi	In the interest of better understanding the processes that influence whether disaster experiences lead to adjustment difficulties, the current study examined pre- and post-disaster factors related to preschool children's functioning following Hurricane Katrina	Hurricane	Journal article	School
25	Ungar	2015	Canada	This article presents diagnostic criteria for assessing childhood resilience in a way that is sensitive to the systemic factors that influence a child's well-being	-	Journal Article	Community
26	Wang	2015	China	This study assesses the resilience theory and its implications for Chinese adolescents	-	Journal article	Community
27	Zaremozhzabieh	2013	Malaysia	The main purpose of the present study is to explore how the internet can improve youth well-being during the disruption arising from floods	Flood	Journal Article	Community
28	Zeng	2011	China	This article presents a community-focused participatory action project designed to promote children's resilience in the early aftermath of the cataclysmic May 2008 Earthquake in Beichuan, China	Earthquake	Journal article	School and community

EDC=Educational disaster center, UACEG=University of Architecture, Civil Engineering and Geodesy, WCDRR=Third UN World Conference on Disaster Risk Reduction, CD-RISC=Connor-Davidson Resilience Scale, IRRP=International Resilience Research Project, CLDRR=Child-led Disaster Risk Reduction, EWDD=EWE-driven disasters, EWE=Extreme weather events, DRR=Disaster risk reduction, YRC=Youth Resilience Corps, ARQ=Adolescent Resilience Questionnaire

there were few studies on their capacity, even in the rescue studies, and far more emphasis has been put on their vulnerability, and few have examined childhood resilience cases. However, in this study, children were considered as a group with a specific focus on their ability and capacity to reduce the risk of disasters. In this regard, on the basis of the previous peer review, a logical model of the resiliency of children in a disaster has not been presented so far. In addition, the review of the articles showed that the studies conducted in these papers did not have a comprehensive approach to children's resilience. Some of the components of resilience, including the individual, and society, and mental health separately no holistic approach.^[19-21,34-43]

Given the mental and emotional tenacity of children, mental health is one of the significant components of their

resilience; however, the damage they endure has been the main subject of research by past researchers. 1838 initial searches in this study were devoted to children's psychological vulnerability.

Moreover, among selected studies referring to children's resilience in disaster situations, each study had a particular view according to their background. For example, the Netherlands study is about factors which enable adolescents to be resilient in a flood disaster whereas^[44] mentioned the individual, social, and environmental factors of child resilience. Moreover, the Indonesian study investigated factors contributing to resilience among survivor children in the age group of 11–15 years,^[45] referred to spiritual health topics considering the importance of the issue of personal-social factors. Studies conducted by

Table 2: Classification of the dependent children resilience factors in DRR

Main Theme	Theme	Sub-theme	Code
Internal factors	Mental health factor	Cognitive	Rational, logical, and critical thinking
		Personal characteristic	Positive attitude
		Educable	Creativity and Intelligence
			Adaptability, flexibility and coping skills
			Expressing emotions and empathy
			Sense of humor
			Feeling control
			Self-control in dangerous situations
			Problem-solving ability
			Have risk perception and awareness of their environmental conditions
			Self-awareness against disasters
			Loving life and hope
			Interest in others
			Optimism about life and their own competence
			Hard worker
			Self-management
			Self-esteem
			Cheerful
			Easy disposition, easy going and easy temperament
	Spiritual health factor	Believing in religious support	Strong internal motivation
			Good Learner
			Active to enhancing skills
			Self-confidence based on their knowledge and skills
			Able to plan
			Faith in god
			Emphasis on prayer
			Learning and reading holy books
			Able to carry out religious practice
			Emphasis ritual ceremonies
	Physical factor	Physical condition and genetic	Self-confidence based on belief in god
			Telling the truth
			Ability to learn
			Physical capacity and better physical health
			Rapid physical recovery
External factors	Socio-behavior factor	Interpersonal/family	Intimate with others
		Interpersonal/friends	Have leadership skills
		Community/school	Willing to be responsible
		Community/neighborhoods	Behave according to the goals
		Cultural embeddedness	Having a sense of community
		Social networks	Participating in school activities
		Social skills	Helping others (youth child, parents, and community)
			Able to live normally after disasters
			Figuring out good time to take action and talk
			Feelings of trust with others
			Have someone to talk to
			Have good friendships and a sense of connectedness with peer group

Contd...

Table 2: Contd...

Main Theme	Theme	Sub-theme	Code
			Team working
			Accessing information, sharing, assessing and feedback (good communication)
			Play and involved in psychosocial activities
			Access and internet skill to use for health
			Educate the community and mentoring
			Experienced chronic adversity and various obstacles
			Socially responsive
			Have family support
	Environmental and ecological factors	Built capital	Access to social support
		Natural capital	Public transport
			Safe streets
			Good social environment
			Positive environmental
			Empowerment to control self and environment
			School supportive environment
			More connected to a wide network
			Access to natural resources for recreation such as water and land

Piangiamore,^[46] Martin,^[3] and Mudavanhu *et al.*^[1] are more specialized in DRR and have addressed the status and importance of the component of perceived disaster risk, which could be one of the most important factors in children's resilience, and are included in the international documents, including the new version of the Sendai framework (2015–2030) which emphasized the necessity of disaster risk perception in all society groups.^[40] The new version of the International Sendai Framework Document emphasizes the important potential of children participation in disasters, but it does not provide any explanation for their resilience, and it is expressed in general terms.^[40,47] Although attention to children as an independent group in this international context is a milestone for recent studies by scholars, new studies suggest that this is starting to change.^[48]

None of the 28 final selected articles in the present study addresses the set of factors for the rescue of children in disasters as an individual topic, but each of them directly or indirectly pointed to factors of child resilience. In general, it seems that due to the lack of comprehensive integration of human components of child resilience, their resilience is neglected due to their capacity, and each researcher who studied it based their work on their own point of view. It attempted to classify the components of resilience with a holistic approach to health according to the WHO definition of health.^[33] However, in the criterion of culture in resilience, it should not be forgotten that different cultures can add or diminish the components.

The current systematic literature review has attempted to present the resilience problem as a practical application in

children and classifies examples of the individual, social, physical, spiritual, ecological, and environmental factors according to previous studies, which can integrate their results into this study. The logical model of children's resilience in disasters is schematically illustrated to summarize the significant domains; a clearer explanation is given here. The mental health domain encompasses the main group of children's resilience criteria in distress, it dates back to the 1970s.^[49]

Several studies postulate the direct relationship between mental health and child resilience.^[20,41,50] For example, Fu's study on the impact of China's earthquake on children's health in 2008 has been successful in improving their mental health resilience after the earthquake.^[43] On the other hand, Grotberg assumes resilience as a human capacity that is effective in overcoming problems and disasters, furthermore, it is a contributing factor in mental health.^[34]

In the present study, three subsets of cognitive factors, personality traits, and children's education have been considered for mental health. To give an example of cognitive cases, positive thinking and critical thinking should be mentioned. In terms of personality, the trait is categorized into creativity and intelligence, adaptability, flexibility and coping skills, expressing emotion and empathy, sense of humor, feeling of control, self-control in dangerous situations, and problem-solving ability.

According to the Hyogo framework, education has a vital role to play in disaster planning and building community resilience and is vital to build societies and improves people's readiness in the future. Well-organized disaster education programs for school children can be an important factor and a measure of

Archive of SID

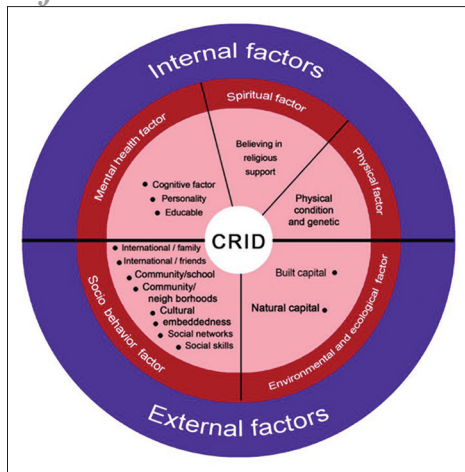


Figure 2: The L.M "CRID" model as child resilience indicators in disasters

effectiveness for communities. It is important to note that children have the ability to transfer disaster risk messages to their families and communities.^[3] Although knowledge enhancement cannot be sufficient alone, it is also important to change people's behavior to reduce the risk and improve their readiness for other parts of the disaster management cycle.^[3] In addition, a school can be one of the best places to reach the goal of promoting knowledge.^[13] Johnson's study, "Evaluating Children's Learning of Adaptive Response Capacities from Shakeout, an Earthquake and Tsunami Drill in Washington State School Districts," confirmed that school emergency drills have a major role in improving children's resilience.^[51] In the last 3 years, a project presented by the Prevention and Crisis Management team in Tehran has been launched in schools to educate both students and teachers, as well as school administrators, about natural disaster risk perception such as an earthquake. Moreover, more focus is put on the structural safety of schools so that not only managers and teachers but also children can be better prepared against earthquake hazards.^[52] As Oktar points out, the school is a very appropriate place for children to learn about DRR.^[13] Based on the above, it seems necessary to use local methods to develop and improve education and increase the children's resilience.

Spiritual health as internal criterion directly related to calmness. Disasters cause high stress not only in children but also in adults. Therefore, having strong cognitive factors and enhancement of robust mental health can bring much relief and comfort to people during and after disasters.

The second group of external factors includes behavioral, social, environmental, and ecological ones that affect the resilience of children as internal factors. Since each person's health is an interaction between themselves and their community,^[53] social-behavioral factors can be an important issue in boosting resilience. Interacting and communicating with others can help children to be resilient, and their interest in participating in social programs should

be nurtured and their opinion listened to, and they should be encouraged to participate in social participation.^[1]

Moreover, this study has referred to how to properly connect with peers, teachers, friends, and other members of the society, another important resilience measure. As Masten commented in a study on homeless and sheltered children, it was confirmed that resilient children get along better with teachers and their peers and display better social behaviors with others,^[32,49] helping others has been confirmed in other texts.^[37,45,54] In fact, resilient children tend to do help out more. In addition, the participation of children in planning and decision-making in disaster situations not only improves their planning but also their resilience. Mudavanhu *et al.*^[1] examined this issue, listening to children's opinions in his study to show the importance of the children's presence in risk reduction planning. Although Acosta has spoken of involving children in disaster planning as an accepted issue, it is still not a widely practiced, and their presence still has several limitations.^[19]

It is necessary to have a resilient community, a resilient family, and to have resilient children. The local culture of each region must be taken into account and efforts should be made to use it in the implementation of social activities and the public participation of children. The external criterion was environmental and ecological factors that affect children's resilience, which should be considered for resilience development. In some studies of those experiencing difficult conditions, encountering barriers to survival have been considered effective measures for developing resilient children.^[2,32] Resilience is a construct that leads to self-safety and health; this is an issue that if solved, may provide happiness for children in the community.^[55] According to Lueger-Schuster,^[56] it must be mentioned that the tolerance ability of children is different, and a resilient child cannot overcome all hardships.

However, according to the above-mentioned conditions can lead to a different degree of resilience for children in different parts of the world. It should be noted that the findings of this study are qualitative, and it is necessary for these areas to be quantitatively measured in the future. To achieve this goal, it is necessary to design a suitable and specific tool for measuring children's resilience in disasters. The research team has created the model and has conducted this systematic study to provide basic information for future research.

Limitations

Only articles in English were included in this systematic literature review. We had limited access to the full text of four journals and three books; however, based on their abstracts, there is little doubt that they were relevant.

Archive of SID

Conclusions

This study focuses on peer-reviewed documents to highlight the determinants of child resilience in disasters and emergencies. However, the lack of an integrated study led to this systematic literature review; it has found two main themes and five subthemes that consist of the internal factors of mental health factor, spiritual health factor, and physical factor. Since children can be an important group in a disaster, the concept of resilience and the provision of objective evidence can make the interventions more realistic and fruitful. This can, perhaps, lead to fundamental changes planning for children to make them more resistant to DRR and will be appropriate for their resilience in DRR programs. Therefore, this study can help planners and policymakers of disaster risk management and child health-care providers by identifying resilience and clarifying its components that should be considered in future decisions and plans and have a beneficial effect on children and teenagers in the near future. It should also be noted that considering the qualitative nature of this study, the necessity of a quantitative study and the provision of a resilience measurement is important, and the researcher will seek to respond to future studies which are currently underway by the research team.

Acknowledgments

This study has been conducted as a part of a PhD program at the Tehran University of Medical Sciences, Tehran, Iran.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Received: 01 Jan 18 **Accepted:** 28 Jan 18

Published: 26 Jun 18

References

- Mudavanhu C, Manyena SB, Collins AE, Bongo P, Mavhura E, Manatsa D. Taking Children's Voices in Disaster Risk Reduction a Step Forward. *International Journal of Disaster Risk Science*. 2015;6:267-81.
- Osofsky JD. Young children and disasters: Lessons learned from Hurricane Katrina about the impact of disasters and postdisaster recovery. *Clinical Work with Traumatized Young Children*. New York, US: Guilford Press; 2011. p. 295-312.
- Martin ML. Child participation in disaster risk reduction: The case of flood-affected children in Bangladesh. *Third World Q* 2010;31:1357-75.
- De Milliano CWJ. Luctor et emergo, exploring contextual variance in factors that enable adolescent resilience to flooding. *International Journal of Disaster Risk Reduction* 2015;14:168-78.
- Costello A, Abbas M, Allen A, Ball S, Bell S, Bellamy R, *et al.* Managing the health effects of climate change: Lancet and university college London institute for global health commission. *Lancet* 2009;373:1693-733.
- Peek L, Stough LM. Children with disabilities in the context of disaster: A social vulnerability perspective. *Child Dev* 2010;81:1260-70.
- Adams ZW, Sumner JA, Danielson CK, McCauley JL, Resnick HS, Grös K, *et al.* Prevalence and predictors of PTSD and depression among adolescent victims of the Spring 2011 tornado outbreak. *J Child Psychol Psychiatry* 2014;55:1047-55.
- Eksi A, Braun KL. Over-time changes in PTSD and depression among children surviving the 1999 Istanbul earthquake. *Eur Child Adolesc Psychiatry* 2009;18:384-91.
- Kanter RK. Child mortality after hurricane katrina. *Disaster Med Public Health Prep* 2010;4:62-5.
- Ardino V. Post-traumatic syndromes in childhood and adolescence: A handbook of research and practice: John Wiley and Sons; 2011.
- Cumiskey L, Hoang T, Suzuki S, Pettigrew C, Herrgard MM. Youth participation at the third UN world conference on disaster risk reduction. *Int J Disaster Risk Sci* 2015;6:150-63.
- Izadkhah YO, Hosseini M. Towards resilient communities in developing countries through education of children for disaster preparedness. *International Journal of Emergency Management* 2005;2:138-48.
- Oktari RS, Shiwaku K, Munadi K, Syamsidik, Shaw R. A conceptual model of a school-community collaborative network in enhancing coastal community resilience in Banda Aceh, Indonesia. *Int J Disaster Risk Reduct* 2015;12:300-10.
- Brown R. Building children and young people's resilience: Lessons from psychology. *Int J Disaster Risk Reduct* 2015;14:115-24.
- Cohrs JC, Christie DJ, White MP, Das C. Contributions of positive psychology to peace: Toward global well-being and resilience. *Am Psychol* 2013;68:590-600.
- Reinelt T, Schipper M, Petermann F. Different pathways to resilience: On the utility of the resilience concept in clinical child psychology and child psychiatry. *Kindheit Entwickl* 2016;25:189-99.
- Ager A. Annual research review: Resilience and child well-being – Public policy implications. *J Child Psychol Psychiatry* 2013;54:488-500.
- Fuller L, Quine CP. Resilience and tree health: A basis for implementation in sustainable forest management. *Forestry* 2016;89:7-19.
- Acosta J, Towe V, Chandra A, Chari R. Youth resilience corps: An innovative model to engage youth in building disaster resilience. *Disaster Med Public Health Prep* 2016;10:47-50.
- Wang JL, Zhang DJ, Zimmerman MA. Resilience theory and its implications for Chinese adolescents. *Psychol Rep* 2015;117:354-75.
- Cénat JM, Derivois D. Psychometric properties of the creole haitian version of the resilience scale amongst child and adolescent survivors of the 2010 earthquake. *Compr Psychiatry* 2014;55:388-95.
- Connor KM, Zhang W. Recent advances in the understanding and treatment of anxiety disorders. Resilience: Determinants, measurement, and treatment responsiveness. *CNS Spectr* 2006;11:5-12.
- IFRC. World Disasters Report 2015: Focus on Local Actors, the Key to Humanitarian Effectiveness. Report No: 978-92-9139-226-1. 24 September, 2015.
- Newman R. APA's Resilience Initiative. *Prof Psychol Res Pract* 2005;36:227.
- Cheraghi MA, Ebadi A, Gartland D, Ghaedi Y, Fomani FK. Translation and validation of "Adolescent resilience questionnaire" for Iranian adolescents. *Asian J Psychiatr* 2017;25:240-5.

Archive of SID

26. Mohammadinia L, Ardalan A, Khorasani-Zavareh D, Ebadi A, Malek-Afzali H, Fazel M. The resilient child indicators in natural disasters: A systematic review protocol. *Health Emerg Disasters Q* 2017;2:95-100.
27. Liberati A, Altman DG, Tetzlaff J, Mulrow C, Gøtzsche PC, Ioannidis JP, *et al.* The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: Explanation and elaboration. *PLoS Med* 2009;6:e1000100.
28. UNICEF. Convention on the Rights of the Child. UNICEF; 1989.
29. Moher D, Liberati A, Tetzlaff J, Altman DG, Group P. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *Int J Surg* 2010;8:336-41.
30. Shamseer L, Moher D, Clarke M, Ghersi D, Liberati A, Petticrew M, *et al.* Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: Elaboration and explanation. *BMJ* 2015;350:g7647.
31. Institute Joanna Briggs. Joanna Briggs Institute Reviewers' Manual 2014 Edition. Adelaide: JBI; 2014. Available from: https://joannabriggs.org/assets/docs/sumari/Reviewers-Manual_Methodology-for-JBI-Scoping-Reviews_2015_v2.pdf. [Last accessed on 2016 Jun 08].
32. Masten AS, Best KM, Garmezy N. Resilience and development: Contributions from the study of children who overcome adversity. *Dev Psychopathol* 1990;2:425-44.
33. Huber M, Knottnerus JA, Green L, van der Horst H, Jadad AR, Kromhout D, *et al.* How should we define health? *BMJ* 2011;343:d4163.
34. Grotberg EH. Resilience programs for children in disaster. *Ambul Child Health* 2001;7:75-83.
35. Guilerá G, Pereda N, Paños A, Abad J. Assessing resilience in adolescence: The spanish adaptation of the adolescent resilience questionnaire. *Health Qual Life Outcomes* 2015;13:100.
36. Mitchell P, Borchard C. Mainstreaming children's vulnerabilities and capacities into community-based adaptation to enhance impact. *Clim Dev* 2014;6:372-81.
37. Prince-Embury S, Saklofske DH. Resilience in children, adolescents, and adults: Translating research into practice. *Resilience in Children, Adolescents, and Adults: Translating Research into Practice*. The Springer Series on Human Exceptionality. New York, US: Springer Science+Business Media; 2013. p. xvii, 349.
38. Ungar M. Practitioner review: Diagnosing childhood resilience – A systemic approach to the diagnosis of adaptation in adverse social and physical ecologies. *J Child Psychol Psychiatry* 2015;56:4-17.
39. Bandrova T, Kouteva M, Pashova L, Savova D, Marinova S, editors. Conceptual framework for educational disaster centre save the children life. *International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*. ISPRS Archives; 2015.
40. Cumiskey L, Hoang T, Suzuki S, Pettigrew C, Herrgård MM. Youth participation at the third UN world conference on disaster risk reduction. *Int J Disaster Risk Sci* 2015;6:150-63.
41. Zaremohzzabieh Z, Samah BA. A review paper: The role of the internet in promoting youth well-being in flood-prone communities. *Asian Soc Sci* 2013;9:75-82.
42. Zeng EJ, Silverstein LB. China earthquake relief: Participatory action work with children. *Sch Psychol Int* 2011;32:498-511.
43. Fu CY. Evaluating the Healing Power of Art and Play: A Cross-Cultural Investigation of Psychosocial Resilience in Child and Adolescent Survivors of the 2008 Sichuan, China Earthquake. US: The Johns Hopkins U; 2012.
44. de Milliano CW. Luctor et emergo, exploring contextual variance in factors that enable adolescent resilience to flooding. *Int J Disaster Risk Reduct* 2015;14:168-78.
45. Ratrin Hestyanti Y. Children survivors of the 2004 Tsunami in aceh, Indonesia: A study of resiliency. *Ann N Y Acad Sci* 2006;1094:303-7.
46. Piangiamore GL, Musacchio G, Pino NA. Natural hazards revealed to children: the other side of prevention. *Geological Society, London, Special Publications* 2015;419:171-81.
47. Aitsi-Selmi A, Egawa S, Sasaki H, Wannous C, Murray V. The Sendai framework for disaster risk reduction: renewing the global commitment to people's resilience, health, and well-being. *Int J Disaster Risk Sci* 2015;6:164-76.
48. Kearney H. Sendai Framework for Disaster Risk Reduction for Children; 2015.
49. Masten AS. Resilience in children threatened by extreme adversity: Frameworks for research, practice, and translational synergy. *Dev Psychopathol* 2011;23:493-506.
50. Massad S, Nieto FJ, Palta M, Smith M, Clark R, Thabet AA. Mental health of children in Palestinian kindergartens: Resilience and vulnerability. *Child Adolesc Ment Health* 2009;14:89-96.
51. Johnson VA, Johnston DM, Ronan KR, Peace R. Evaluating children's learning of adaptive response capacities from shakeout, an earthquake and tsunami drill in two Washington state school districts. *J Homel Secur Emerg Manag* 2014;11:347-73.
52. Sadeghi A. Education of Ready School: Tehran Disaster Mitigation and Management Organization. Tehran, Iran; 2015. p. 91-100.
53. Nazli A. "I'm healthy": Construction of health in disability. *Disabil Health J* 2012;5:233-40.
54. Feitelberg SA. Response to Hurricane Ivan in Grand Cayman: Culture, Resilience, and Children. US: Fielding Graduate U; 2007.
55. Exenberger S, Juen B. Well-being, Resilience and Quality of Life from Children's Perspectives: A Contextualized Approach. New York, US: Springer Science+Business Media; 2014.
56. Lueger-Schuster B, Ardino V. Helping children after mass disaster: Using a comprehensive trauma center and school support. *Post-traumatic syndromes in childhood and adolescence: A handbook of research and practice*. 2011:255-72.