

Education Methods to Improve Earthquake Preparedness Among Students: A Literature Review

Aan Nuraeni¹, Salsabila Nabilla Puspa Ilham¹, Nara Raihani¹, Rini Dwi Puspitasari¹, Nurul Azmi Fauziyah¹, Myra D Oruga²

¹Faculty of Nursing, Universitas Padjadjaran, Indonesia, ²Faculty of Management and Development Studies, University of the Philippines Open University, Philippines.

Email: aan.nuraeni@unpad.ac.id

Abstract

Earthquake is frequent disasters in Indonesia, and children or students are a group that is vulnerable to becoming victims. Preparedness is one of the efforts that can be made to anticipate losses due to disasters, one of which is through education. However, educational methods related to preparedness carried out for students are still little identified. This literature review aims to identify educational methods to improve earthquake disaster preparedness, especially for students. This study used a literature review with a descriptive review approach. The databases used include PubMed, ScienceDirect, DOAJ, Garuda, and Google Scholar, published from 2018 to 2022. The result of study that article selection was carried out, including checking for duplication, suitability of titles, abstracts, and inclusion and exclusion criteria. From this selection, 14 articles were included in this literature review. It was found that several methods can be used to improve disaster preparedness, such as the simulation method, education with lectures, singing, and others, as well as a combination of simulation with other methods, all of which can increase the preparedness score. Meanwhile, students who deal with a disaster have the potential to gain an increase in disaster preparedness. Simulation, education, and combining both methods were practical in increasing earthquake disaster preparedness.

Keywords: Education, earthquake, preparedness, students.

Introduction

Indonesia is an archipelagic country that has a high potential for disasters. Disasters in Indonesia often occur, and natural factors cause the majority. Various natural disasters often occur in Indonesia, are volcanic eruptions, tsunamis, floods, hurricanes, landslides, and earthquakes. Earthquakes are the most frequent disaster events in Indonesia. The Meteorology, Climatology and Geophysics Agency (BMKG) in Indonesia stated that in 2019, 11,515 earthquakes were recorded in Indonesia and decreased in 2020 to 8,264 earthquakes.

Meanwhile, in 2021 there will be another increase from the previous year to reach 10,570 earthquakes. Of the total earthquake incidents, the Department of Geology (ESDM) in Indonesia recorded 26 earthquakes that damaged or resulted in casualties, infrastructure damage, and property loss. The amount of damage is the highest in the last 20 years.

Preparedness is an effort that can be made to anticipate the occurrence of casualties, loss of property, and losses to the high social order of life due to disasters (Husna, 2011). Preparedness focuses on the ability to carry out disaster emergency response operations quickly and accurately compared to disaster management efforts. The Indonesian Institute of Sciences (LIPI) and the United Nations Educational, Scientific, and Cultural Organization (UNESCO), state that five factors can influence disaster preparedness. They are knowledgeable and have attitudes toward disaster risk, policies, and guidelines, planning for disaster emergency conditions, warning systems, disasters, and resource mobilization capabilities. Weak preparedness can lead to more severe disaster impacts such as high death tolls, serious injuries, extensive infrastructure damage, and the emergence of diseases resulting from disasters.

Children are one of the most vulnerable groups when an earthquake occurs. Their vulnerability to disasters is due to their limited understanding of the risks around them, so they are unprepared to face disasters. In several earthquake disaster incidents, most victims were school-age children during and outside school hours. This situation shows the importance of raising disaster risk awareness in children as early as possible so that children are expected to know what to do when a disaster occurs. Providing understanding and guidance to children about what to do when a disaster occurs around them is a form of disaster preparedness (Indriasari, 2018). Currently, disaster risk reduction knowledge is still not included in the education curriculum in Indonesia. However, several institutions have actively educated school-age children regarding disaster preparedness, especially earthquake preparedness. Apart from conventional education, a simulation method can also be used to increase knowledge regarding disaster risk and its management. However, there was little evidence concerning it.

Therefore, we intend to conduct a literature review to identify education methods for preparing students for earthquake disasters. In addition, we also try to identify the potential of its efficacy in increasing students' preparedness for the earthquake.

Methods

This research is a literature review with a descriptive review approach.

Eligibility Criteria

The inclusion criteria in this study were that the article was primary research investigating educational methods for earthquake disaster preparedness in students. Another inclusion criterion is the availability of the full text in Indonesian and English, with a publication period between 2018-2022. The exclusion criteria from this study were secondary research, such as reviews and research on the subject of children with special needs.

Search Strategy

Two reviewers (SNPI, RDP) performed a structured literature search on five databases, including PubMed, ScienceDirect, DOAJ, Garuda, and Google Scholar. Keywords were arranged using the words 'student', 'simulation', 'education', 'disaster education', 'disaster training', 'earthquake', 'earthquake preparedness'. The literature search process used the booleans 'OR' and 'AND'.

Article Selection

The selection of articles in this study was carried out by four reviewers (SNPI, NR, RDP, NAF). Articles included in the initial search were selected by examining duplication, suitability of titles, abstracts, and inclusion-exclusion criteria for the review. Disagreements regarding the appropriateness of the articles were decided through discussions within the research team.

Data Extraction and Synthesis

The data extraction table contains information related to the research characteristics of the analyzed studies and used to assist in data synthesis. Another research team checked the information listed in the table. The characteristics of the studies consist of research design, research objectives, participants, interventions, and results. Furthermore, we summarized, compared, and reported the research results qualitatively according to the problems and research objectives.

Results

A total of 29,285 articles were identified in the initial search, consisting of 131 from PubMed, 314 from ScienceDirect, five from DOAJ, 135 from Garuda, and 28,700 from Google Scholar. A total of 38 articles were excluded due to duplication, and 12,443 articles were excluded because the title did not match the research. Then 16,219 articles were examined based on inclusion and exclusion criteria, and 17 full texts were obtained, which were then selected based on inclusion and exclusion criteria, and three papers were excluded. The procedure for choosing this study is described in Figure 1.

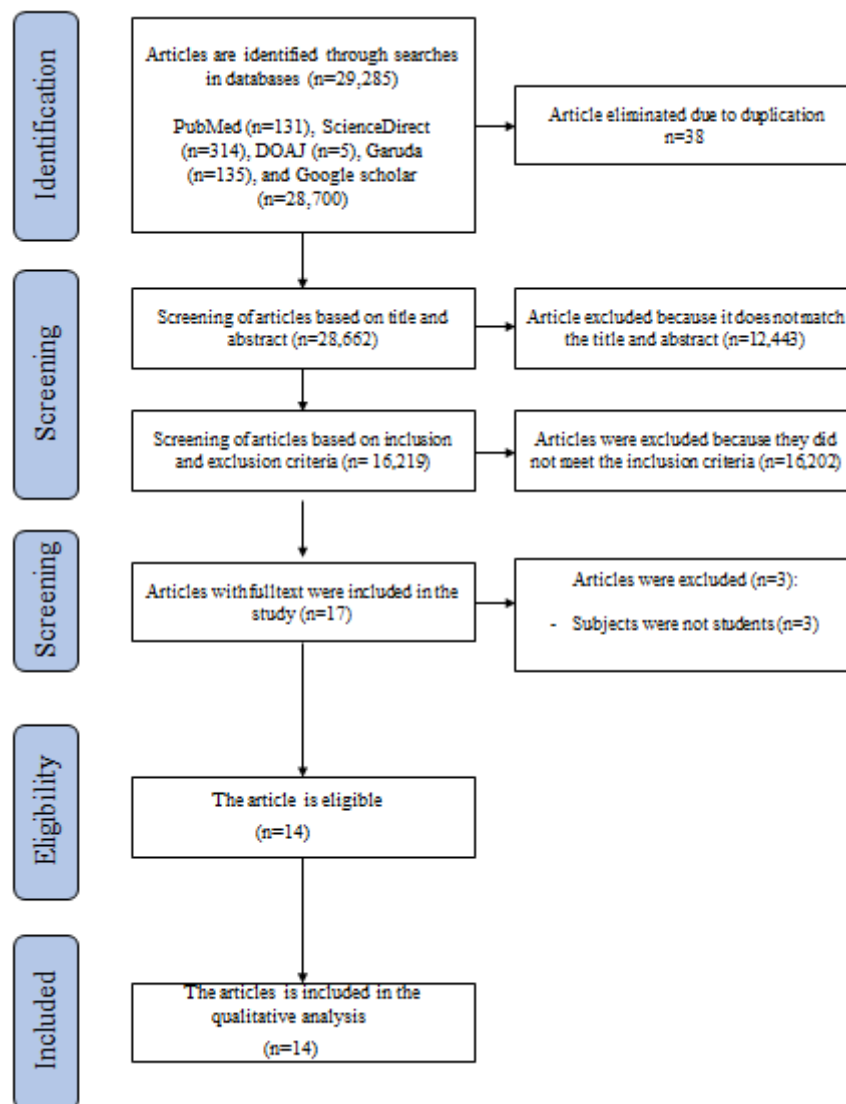


Figure 1. Search Results and Article Selection Procedures

Article Characteristics

There are twelve articles included in the qualitative analysis. All of the research articles collected were in Indonesian, and the research was conducted in Indonesia. Most of the articles used experimental research methods with seven quasi-experimental studies, four pre-experimental studies, and one true-experimental study. In addition, there was also one paper, each using a mixed approach and quantitative descriptive.

Interventions

Seven studies (50%) discussed educational methods without simulation. In comparison, the other two studies (14.3%) discussed simulation methods, and three articles (21.4%) further discussed simulation combined with other educational methods to increase earthquake preparedness among students. In addition, the effects of the experience of dealing with disasters were also identified and further increased students' disaster awareness in the two articles analyzed (14.3%).

Table 1. Summary of Peer-reviewed Journal Articles Supporting Recent Research on Simulation and Education Methods to Improve Earthquake Preparedness among Students.

No	Author, Year (Country)	Title	Research design, Objectives, Participants	Interventions	Results
1.	Setyaningrum and Usmawati (2020) (Indonesia)	The Effect of Earthquake and Tsunami Disaster Education on Emergency Planning Preparedness among students (<i>Pengaruh Pendidikan Bencana Gempa Bumi dan Tsunami terhadap Kesiapsiagaan Emergency Planning Siswa</i>)	Design: Pre-experimental design Purposes: To determine the effect of earthquake and tsunami disaster education on emergency planning. Participants: 46 students of grade 5 elementary school	Participants were given education on earthquake and tsunami disaster preparedness through the lecture method.	The results showed that there was a significant effect on students' emergency planning preparedness before and after the intervention.
2.	Setyaningrum and Nurhayati (2021)	Earthquake Disaster Education Improves	Design: Pre-experimental Design Purposes: to determine the effect	Providing earthquake education with the lecture method.	The results of these measurements are mostly in ready category with a

	(Indonesia)	Preparedness for Students at Elementary School of Jigudan Srandakan Bantul Indonesia	of earthquake disaster education on the level of preparedness of Jigudan Srandakan Elementary School students. Partisipan: 54 students.		score of 65 – 79 as many as 42 students.
3.	Setyaningrum and Setyorini (2020) (Indonesia)	The Effect of Earthquake and Tsunami Disaster Education on the Level of Preparedness in Students (<i>Pengaruh Pendidikan Bencana Gempa Bumi dan Tsunami terhadap Tingkat Kesiapsiagaan pada Siswa</i>)	Design: Pre-experimental Design Purposes: to determine the effect of earthquake and tsunami disaster education on the level of preparedness of Jigudan Srandakan Elementary School students. Participants: 46 students.	Providing education through lectures, videos, singing about earthquake and tsunami disaster preparedness.	Earthquake and tsunami disaster education can increase the level of preparedness for students at SDN Jigudan Srandakan, Bantul Regency.
4.	Metrikayanto and Valabia (2021) (Indonesia)	An Educational Video For Earthquake Disaster Preparedness In Students At St. Aloysius Weetabula Christian Middle School, Southwest Sumba	Design: Pre-experimental design with one-group pre-post test. Purpose: to determine the effect of educational videos on earthquake disaster preparedness in students. Participants: 327 students	Earthquake disaster educational video	Educational videos influencing earthquake disaster preparedness in high school students. The use of video media in education can improve earthquake disaster preparedness.
5.	Yustisia, Aprilatutini, and Utama (2019) (Indonesia)	The Effect of Simulation of Facing Earthquake Disasters on Preparedness of Students at SDN 86 Bengkulu City (<i>Pengaruh Simulasi Menghadapi Bencana Gempa Bumi terhadap Kesiapsiagaan</i>)	Design: Quasi experimental design with non equivalent control group design Purpose: to determine the effect of earthquake disaster simulation on school preparedness of students at SDN 86 Bengkulu City. Participants: 31 students in grades IV	Respondents in the experimental group received training on earthquake disaster management in 1 meeting with a time of 120 minutes. Training is conducted on agreed days. The training includes the provision of materials, discussions,	The results of the study show that there is an influence on disaster preparedness using the simulation method. Earthquake preparedness training increases students' level of disaster awareness.

		Siswa SDN 86 Kota Bengkulu)	and V who were given a simulation (experimental group) and 31 people who were not given a simulation (control group)	practices and simulations of disaster management. As a tool, material in the form of leaflets was also prepared to be given to students participating in the training.	
6.	Ratchna, Suriah, and Saleh (2019) (Indonesia)	Earthquake Disaster Preparedness Education in Elementary School Students in Majene Regency	Design: <i>Quasi Experiment with Non Randomized Pre-test Post-Test Control Group Design</i> Purposes: to determine the effect of education using simulation methods and picture books on knowledge of disaster preparedness Participants: 70 students.	SDN 26 Pakkola as the intervention group was given education using the simulation method and picture books while SDN 28 Tamo as the control group was only given education with picture books.	There is an educational influence of earthquake disaster simulation and picture books on knowledge
7.	Romdhonah, Sucipto, and Nekada (2019) (Indonesia)	The Effect of Earthquake Disaster Management Education on Students' Preparedness in Facing Earthquakes (<i>Pengaruh Edukasi Manajemen Bencana Gempa Bumi terhadap Kesiapsiagaan Siswa dalam Menghadapi Gempa Bumi</i>)	Design: Quasi Experiment with pre-post test control group design. Purposes: To find out the effect of providing education earthquake disaster management on student preparedness in the face of earthquakes. Participants: 36 students.	Providing material related to earthquake disaster preparedness using the lecture method.	There were differences in the level of pre and post test preparedness in the control group and the intervention group. There was no difference in the level of post-test preparedness in the two groups.
8.	Achmad (2020) (Indonesia)	The Effect of Earthquake Disaster Education on Increasing Knowledge and Attitudes of Karya Bangsa	Design: quasi experiment with pretest-posttest approach with control group Purposes: to determine the effect of earthquake	Earthquake disaster education	The results of the study were that there were differences in the knowledge and attitudes of the respondents who were higher in the intervention group before and after being

		Vocational School Students, Tangerang City	disaster education on increasing students' knowledge and attitudes Participants: 50 students.		given earthquake disaster education.
9.	Setyaningrum and Sukma (2020) (Indonesia)	Increasing Knowledge of SMA/SMK Students in Malang Through Earthquake Disaster Education with Simulation Methods (<i>Peningkatan Pengetahuan Siswa SMA/SMK Malang Melalui Pendidikan Bencana Gempa Bumi dengan Metode Simulasi</i>)	Design: Quasi Experiment Purposes: analyze the level of knowledge and attitudes of high school students before and after being given earthquake disaster education. Participants: 66 high school students.	Edukasi bencana gempa bumi.	There was an increase in knowledge from before being given the intervention to 76.72 where before being given health education the average knowledge score was 35.78.
10.	Sari et al. (2019) (Indonesia)	Earthquake Readiness Education Using Simulation Method and Picture Book Media in Elementary School Students in Majene Regency	Design: Quasi Experiment Purposes: to analyze the impact of education using simulation methods and picture books on the knowledge and attitudes of elementary school students regarding earthquake disaster preparedness Participants: 70 Students	Earthquake preparedness education	There was an increase in preparedness after the earthquake preparedness education was carried out as evidenced by the significant difference between the pre-test and post-test scores.
11.	Simandalahi, Apriyeni, and Pardede (2019) (Indonesia)	The Influence of Health Education on Students' Knowledge of Earthquake Disaster Preparedness (<i>Pengaruh Pendidikan Kesehatan Terhadap</i>	Design: Quasi Experiment Purposes: to determine the effect of health education on students' knowledge of earthquake disaster preparedness. Participants: 48 students of class III	Health education on earthquake disaster preparedness which has been adapted to BNPB material on "Resilient Responsiveness to Disasters"	There was an increase in knowledge after being given health education as evidenced by the increase in post-test scores compared to pre-test scores.

		<i>Pengetahuan Siswa Tentang Kesiapsiagaan Bencana Gempa Bumi)</i>	and IV elementary school.		
12.	Widodo (2020) (Indonesia)	The Influence of the Disaster Simulation Method on the Preparedness of Students of SMP Negeri 4 Cigeulis, Pandeglang Regency in Facing Earthquake Threats (<i>Pengaruh Metode Simulasi Bencana Terhadap Kesiapsiagaan Peserta Didik SMP Negeri 4 Cigeulis Kabupaten Pandeglang dalam Menghadapi Ancaman Gempa Bumi</i>)	Design: Experimental research. Purposes: to determine the effect of disaster simulation methods on student preparedness. Partisipan: 100 junior high school students.	Disaster simulation.	After the earthquake disaster simulation, there was an increase in preparedness to deal with earthquakes as shown by the score during the pre-test of 54.33 (unprepared) to 110.59 during the post-test (ready).
13.	Aiko Sakurai a, Takeshi Sato, Yoshiyuki Murayama (2020) (Japan).	Impact evaluation of a school-based disaster education program in a city affected by the 2011 great East Japan earthquake and tsunami disaster	Design: a mixed-methods approach. Purpose: This study investigated a school-based disaster education program called the "Reconstruction Mapping Program (RMP)". The aim of the Program was set as developing children's attitudes towards contributing to the community. Participants: The fourth-grade students	A disaster education program emphasizes positive aspects of reconstruction in consideration of the disaster-affected children's mental care.	The program impacts students' desire to contribute to society in the long term. Meanwhile, only a little impact was seen on behavior in their disaster preparedness and mitigation. This program can make students "agents of change" to create a disaster-resilient society
14.	Benyong	Evaluating the	Design: Quantitative	Evaluate the	More than 50% of

Wei, Guiwu Su a, Yingkui Li (2020) (China)	cognition and response of middle/high school students to earthquake—a case study from the 2013 Mw6.6 Lushan earthquake-hit area, China	research Purpose: Investigated the capability of earthquake disaster cognition and response (EDCR) based on a questionnaire survey of middle/high school students in the 2013 Lushan earthquake-stricken area. Participant: Middle/high school students.	earthquake disaster cognition and response capability of the middle/high school student based on earthquake experienced.	participants had an EDCRI score between 0.51 and 0.70, indicating a moderate level of comprehensive EDCR ability. For individual EDCR components, the average score of emergency response ability and knowledge of earthquake disasters is relatively low, while the average score of emotion regulation is very good.
--	--	--	--	--

Table 2. Summary of Peer-reviewed Journal Articles informing the Effectiveness and Characteristics of Simulation and Education Methods to Improve Earthquake Preparedness among Students.

No	Refference	Use of Simulation Methods	Use of Other educational methods	Effective in increasing earthquake preparedness	Educational level	Method characteristics	
						Frequency	Media
1.	Setyaningrum and Usmawati (2020)	No	Yes	Yes	Elementary school	1 session	Lecture
2.	Setyaningrum and Nurhayati (2021)	No	Yes	Yes	Elementary school	1 session	Lecture
3.	Setyaningrum and Setyorini (2020)	No	Yes	Yes	Elementary school	1 session	lecture, video, singing
4.	Metrikayanto and Valabia (2021)	No	Yes	Yes	Yunior high school	1 session	Video
5.	Yustisia, Aprilatutini, and Utama (2019)	Yes	No	Yes	Elementary school	5 session	Earthquake simulation with role playing method
6.	Ratchna, Suriah, and Saleh (2019)	Yes	Yes	Yes	Elementary school	1 session	Earthquake simulation and educational book

7.	Romdhonah, Sucipto, and Nekada (2019)	No	Yes	Yes	Senior high shcool	1 session	Lecture
8.	Achmad (2020)	No	Yes	Yes	Senior high shcool	1 session	Lectures and discussions using power point (slides), leaflets, and video simulations
9.	Setyaningrum and Sukma (2020)	Yes	Yes	Yes	Senior high shcool	1 session	Lectures using audio visual via LCD projector, and earthquake simulation
10.	Sari et al. (2019)	Yes	Yes	Yes	Element ary school	1 session	Earthquake simulation and picture book.
11.	Simandalahi, Apriyeni, and Pardede (2019)	No	Yes	Yes	Element ary school	1 session	<i>Slide power point and leaflet</i>
12.	Widodo (2020)	Yes	No	Yes	Yunior high school	1 session	Earthquake disaster simulation
13.	Aiko Sakurai a, Takeshi Sato, Yoshiyuki Murayama (2020) (Japan).	No	Experience dealing with disasters	Increase the desire to contribute to disaster preparedness in the community	The fourth-grade students	NI	NI
14.	Benyong Wei, Guiwu Su a, Yingkui Li (2020) (China)	No	Experience dealing with disasters	Improve cognition and response to disaster preparedness	Middle/ high school students	NI	NI

Based on the results of a literature search, learning methods that can improve earthquake disaster preparedness in students are as follows:

Simulation

The study by Yustisia et al. (2019) showed that the simulation method can affect increased preparedness for children in dealing with disasters. In this study, students were divided into two groups: the experimental group which was given a simulation of five sessions and the control group which was not given a simulation. It was found that in the experimental

group there was an increase in preparedness compared to the control group. This is in line with Widodo (2020) study which also discussed the potential effect of providing a simulation method in increasing disaster preparedness. In this study, all participants were given one session of earthquake simulations, then an evaluation was carried out and the results showed that there was an increase in preparedness in dealing with the threat of earthquakes after the simulation.

Other Education Methods

Disaster education is effective in increasing preparedness. Disaster education is carried out with the aim of changing or influencing individual behavior. Based on the study by Setyaningrum and Nurhayati (2021), most participants indicated that they were ready to face an earthquake. Students can plan to save themselves if an earthquake occurs. In their other studies, Setyaningrum and Usmawati (2020) and Simandalahi et al. (2019) both showed that there was a significant potential influence on earthquake disaster preparedness for students after being given education. Participants received education in the form of a lecture session which was evaluated using a pre and post test questionnaire and the results showed that there was a significant increase in scores between the pre and post test.

Effective disaster education can be carried out using methods other than lectures, namely by providing videos and singing, which are known to have good effectiveness, with significant differences in scores between the pre and post-tests (Setyaningrum & Setyorini, 2020). The effectiveness of providing education through video is also discussed in the research by (Metrikayanto & Valabia, 2021). In his research, education via video was provided in one session and evaluated using pre and post-questionnaires. The results show that most of the respondents have a high level of earthquake disaster preparedness after watching the video.

Education through providing videos plus teaching aids has also been studied by Achmad (2020), the pre and post tests showed that there were differences in the knowledge and attitudes of the respondents before and after being given education on the earthquake disaster. Romdhonah, Sucipto, and Nekada (2019) conducted study on the same topic with different types of research. In this study, participants were divided into the control group and the intervention group. There were differences in the evaluation results of the two groups, where preparedness in the intervention group showed higher results.

Simulation Combine with Other Educational Methods

The combination of simulation and education are two methods that can be applied at one time. Based on research conducted by Sari et al. (2019), participants in the experimental

group (given simulations and education) showed increased knowledge and preparedness in dealing with earthquake disasters. In another study, Sari et al. (2019), identified that after conducting preparedness education and simulations, there was an increase in knowledge and preparedness for participants who were in elementary school. This outcome aligns with the results of research conducted by Setyaningrum and Sukma (2020), which also discussed simulation and educational methods to increase knowledge and attitudes in dealing with earthquake disasters. In this study, 66 participants were given education using audio-visual media and a simulation, which increased knowledge and attitudes in dealing with earthquake disasters.

Experience Dealing with Disasters

Experience in dealing with disasters provides awareness of the cognition and response to disaster preparedness (Wei, Su, & Li, 2020). These results were shown by two studies conducted in Japan and China where students with related experience showed a higher awareness of disasters and a strong desire to improve people's ability to deal with disasters (Sakurai, Sato, & Murayama, 2020; Wei et al., 2020), although not accompanied by an increased ability to improve behavior—disaster preparedness. The results of these studies did not explain the interventions that can be carried out to increase disaster preparedness among students. However, the experience of undergoing a disaster can potentially influence disaster awareness.

Discussion

According to Yustisia et al. (2019), preparedness is a determining factor for reducing disaster risk, likewise with knowledge which can also be one of the factors that can reduce disaster risk. Setyaningrum and Setyorini (2020) state that some of the main causes of the emergence of many victims due to earthquake disasters are a lack of knowledge about disasters and lack of preparedness in anticipating these disasters. A high level of knowledge and preparedness gives positive results such as reducing the number of fatalities when natural disasters occur.

Based on the literature review results, several methods were obtained that could increase preparedness in dealing with earthquake disasters including simulation methods, education, and a combination of the two. The simulation method is one of the examples proposed to increase earthquake preparedness for students. Simulation is a representation of learning experiences using fictional situations to understand certain concepts, principles or

skills. This simulation can be used as a teaching method with the assumption that not all learning processes can be carried out directly on real objects. This simulation can influence one's knowledge and actions towards earthquake disaster management (Yustisia et al., 2019). Through this method, students will try to put themselves in a situation when an earthquake disaster occurs (roleplay) and this will make most of the preparedness scores easier to remember. So that when an actual earthquake disaster occurs, it is hoped that the things that have been learned can be applied and this can reduce the number of fatalities due to earthquake disasters. From a total of three articles, all stated that the use of the simulation method could increase preparedness in dealing with earthquake disasters.

The educational method was carried out by providing material regarding earthquake disaster preparedness. Providing education, one of which uses the lecture method with tools, for example short papers, slides, sound systems and leaflets (Romdhonah, Sucipto & Nekada 2019). The educational method aims to influence the level of student knowledge which has something to do with the level of student readiness in accordance with this research from students who do not know about earthquake and tsunami disaster preparedness to become more knowledgeable about earthquake and tsunami preparedness issues (Setyaningrum & Setyorini, 2020). From a total of 7 articles studied, all of them stated that there was an increase in the final evaluation value after being given education.

Several studies have been conducted that discuss the combination of simulation methods with education in increasing earthquake disaster preparedness. This method is carried out by providing education to participants in advance using the help of various media such as picture books and audio-visual (Sari et al., 2019; Setyaningrum & Sukma, 2020). Then after the education is carried out, it will be followed by a disaster simulation which is practiced directly by all participants. The use of this method has the same goal as the previous two methods to increase knowledge and preparedness in dealing with earthquake disasters. Three articles were found that used this method in their research, and all of these articles stated that after education was carried out, which was then followed by a simulation or roleplay, there was an increase in the final evaluation value, indicating that this method was effective in increasing knowledge and earthquake disaster preparedness.

The review results show that in addition to the intervention in the form of disaster education provided, the experience of experiencing a disaster for students can improve cognition and response to disaster preparedness (Sakurai et al., 2020; Wei et al., 2020). Disaster-related experiences for students elicit cognitive and emotional responses (Yeon,

Chung, & Im, 2020). Yeon (2020) further identified that students with active emotional reactions like shock, fear, and displeasure tend to have more compelling educational experiences. At the same time, the perceived intensity of the cognitive response in this study did not significantly affect the effectiveness of education. Yeon emphasizes that students' emotional responses are more important than their cognitive responses in delivering disaster education programs. Immediate disaster education for children and adolescents needs to be given if emotional reactions such as shock, sadness, and fear of future disasters are experienced by them.

Conclusion

A disaster is an event that can cause death, damage to infrastructure, and loss of property. Preparedness in dealing with disasters is one of the efforts to reduce losses due to disasters. The method of disaster preparedness education that is widely used particularly in Indonesia is simulation; education with other methods such as lectures, playing, singing, and a combination of both. Furthermore, disaster education must be carried out as soon as possible, especially for students who experience disasters with emotional reactions, because the results can be more effective. Through these methods, there is an increase in the disaster preparedness score. From the results of the literature study that has been carried out, all three can significantly increase preparedness in dealing with earthquake disasters.

References

- Achmad, V. S. (2020). Pengaruh Pendidikan Bencana Gempa Bumi Terhadap Peningkatan Pengetahuan Dan Sikap Siswa Smk Karya Bangsa Kota Tangerang. *Jurnal Medikes (Media Informasi Kesehatan)*, 7(2), 297–304. <https://doi.org/10.36743/medikes.v7i2.248>.
- Husna, C. (2011). Influencing Factors on Disaster Preparedness RSUDZA Banda Aceh. *Idea Nursing Journal*, 3(2), 10–19.
- Indriasari, F. N. (2018). Pengaruh Pemberian Metode Simulasi Siaga Bencana Gempa Bumi terhadap Kesiapsiagaan Anak di Yogyakarta. *Jurnal Keperawatan Soedirman*, 11(3), 199. <https://doi.org/10.20884/1.jks.2016.11.3.700>.
- Metrikayanto, W. D., & Valabia, V. G. (2021). An Educational Video For Earthquake Disaster Preparedness In Students At St. Aloysius Weetabula Christian Middle School, Southwest Sumba. *Journal of Health Sciences*, 14(02), 166–172. <https://doi.org/10.33086/jhs.v14i02.1690>.
- Ratchna, S., Suriah, & Saleh, L. M. (2019). Earthquake Disaster Preparedness Education in

- Elementary School Students in Majene Regency. *Hasanuddin International Journal Of Health Research*, 1(01), 3–6.
- Romdhonah, D. L., Sucipto, A., & Nekada, C. D. Y. (2019). Pengaruh Edukasi Manajemen Bencana Gempa Bumi Terhadap Kesiapsiagaan Siswa Dalam Menghadapi Gempa Bumi. *Jurnal Ilmu Kesehatan*, 10(1), 1–9.
- Sakurai, A., Sato, T., & Murayama, Y. (2020). Impact evaluation of a school-based disaster education program in a city affected by the 2011 great East Japan earthquake and tsunami disaster. *International Journal of Disaster Risk Reduction*, 47(April), 101632. <https://doi.org/10.1016/j.ijdr.2020.101632>.
- Sari, R., Ishak, H., Sidin, A. ., Nasir, S., & Saleh, L. M. (2019). Earthquake Readiness Education Using Simulation Method and Picture Book Media in Elementary School Students in Majene Regency. *Galore International Journal of Applied Sciences and Humanities*, 3(3), 30–36.
- Setyaningrum, N., & Nurhayati, P. (2021). Earthquake Disaster Education Improves Preparedness for Students At Elementary School of Jigudan Srandakan Bantul Indonesia. *Journal of Health Community Service*, 1(2), 55–59. <https://doi.org/10.33086/jhcs.v1i2.2232>.
- Setyaningrum, N., & Setyorini, A. (2020). Pengaruh Pendidikan Bencana Gempa Bumi dan Tsunami Terhadap Tingkat Kesiapsiagaan pada Siswa. *Jurnal Keperawatan*, 12(4), 777–788.
- Setyaningrum, N., & Usmawati, D. (2020). Pengaruh Pendidikan Bencana Gempa Bumi Dan Tsunami Terhadap Kesiapsiagaan Emergency Planning Siswa Di SDN Jigudan Pandak Bantul Yogyakarta. *Jurnal Keperawatan Dan Kesehatan*, 11(2), 1–6. <https://doi.org/10.54630/jk2.v11i2.119>.
- Setyaningrum, Y. I., & Sukma, G. I. (2020). Peningkatan Pengetahuan Siswa Sma/Smk Malang Melalui Pendidikan Bencana Gempa Bumi Dengan Metode Simulasi. *Indonesian Journal for Health Sciences*, 4(2), 68. <https://doi.org/10.24269/ijhs.v4i2.2414>.
- Simandalahi, T., Apriyeni, E., & Pardede, R. (2019). Pengaruh Pendidikan Kesehatan Terhadap Pengetahuan Siswa Tentang Kesiapsiagaan Bencana Gempa Bumi. *Jurnal Kesehatan Medika Saintika*, 10(1), 107. <https://doi.org/10.30633/jkms.v10i1.314>.
- Wei, B., Su, G., & Li, Y. (2020). Evaluating the cognition and response of middle/high school students to earthquake—a case study from the 2013 Mw6.6 Lushan earthquake-hit area, China. *International Journal of Disaster Risk Reduction*, 51(August), 101825. <https://doi.org/10.1016/j.ijdr.2020.101825>.
- Widodo, T. (2020). Pengaruh Metode Simulasi Bencana Terhadap Kesiapsiagaan Peserta Didik SMP Negeri 4 Cigeulis Kabupaten Pandeglang Dalam Menghadapi Ancaman Gempa Bumi. *Jurnal Pendidikan Geosfer*, VI, 36–44. <https://doi.org/10.23701/jpg.v6i1.22133>.

- Yeon, D. H., Chung, J. B., & Im, D. H. (2020). The effects of earthquake experience on disaster education for children and teens. *International Journal of Environmental Research and Public Health*, 17(15), 1–14. <https://doi.org/10.3390/ijerph17155347>.
- Yustisia, N., Aprilatutini, T., & Utama, T. A. (2019). Pengaruh Simulasi Menghadapi Bencana Gempa Bumi Terhadap Kesiapsiagaan Siswa Sdn 86 Kota Bengkulu. *Journal of Nursing and Public Health*, 7(2), 32–38. <https://doi.org/10.37676/jnph.v7i2.888>.