The Effect of Earthquake Disaster Simulation Video on Disaster Preparedness Practices Among Elementary School Students

Monika Agustin[1], Nyayu Nina Putri Calisanie[2*], Salma Attiyah[1], Nunung Nurhayati[1], Bhakti Permana[1]

[1]Bachelor Student of STIKep PPNI Jawa Barat, Bandung
[2]Lecturer of Bachelor Student Program of STIKep PPNI Jawa Barat

OPEN ACCESS

Proceeding STIKep PPNI Jawa Barat

Website :
https://proceedings.stikep-ppnijabar.ac.id/index.php/psj

Volume 1 (1), 285-290

Article info
Received : December 28, 2024
Revised : April 22, 2025
Accepted : May 02, 2025
Published : May 19, 2025

Corresponding author
Nyayu Nina Putri Calisanie*
Sekolah Tinggi Ilmu Keperawatan PPNI Jawa Barat, Bandung, Indonesia
Jl. Muhammad No 34 Bandung, Indonesia
Email: :nina.calisanie@gmail.com

Citation
Agustin, M., Calisanie, N. N. P., Attiyah, S., Nurhayati, N., & Permana, B. (2025). The Effect Of Earthquake Disaster Simulation Video On Disaster Preparedness Practices Among Elementary School Students. *Proceeding STIKep PPNI Jawa Barat*, 1(1), 285-290

Abstract

Objective: This study aimed to evaluate the effect of animated educational videos combined with disaster simulation activities on earthquake preparedness among elementary school students.

Method: A quasi-experimental design with a one-group pretest-posttest approach was employed. The study involved a total of 60 students from an elementary school, selected using total sampling. Data were collected using a validated questionnaire measuring knowledge of earthquake disaster preparedness. The intervention consisted of an animated video explaining earthquake safety procedures followed by a practical simulation. Data were analyzed using the Wilcoxon signed-rank test to determine differences in preparedness scores before and after the intervention.

Results: The average age of participants was 10 years, with the majority being female (66.7%). Prior to the intervention, the mean preparedness score was 5.30. Following the animated video and simulation session, the mean score increased significantly to 15.43. The results of the Wilcoxon test indicated a statistically significant improvement in preparedness scores, with a p-value of 0.000 ($p < 0.05$), confirming that the intervention had a positive effect.

Conclusion: The combination of animated videos and earthquake disaster simulations significantly improved disaster preparedness among elementary school children. These findings suggest that interactive, visual-based educational tools are effective in increasing children's understanding and readiness in the event of an earthquake. Schools are encouraged to incorporate similar methods as part of their disaster education curriculum to foster early awareness and safety-oriented behavior in students.

Keywords: Elementary school children, Preparedness, Simulation Videos

INTRODUCTION

The Lembang Fault is one of the active fault lines closely monitored in West Java due to its potential seismic activity. Stretching approximately 29 kilometers from Mount Manglayang to Padalarang, this fault line passes through two districts, one of which is West Bandung Regency (KBB). In this regency, the Lembang Fault spans from the 0 km to 20 km measurement line. According to geological studies, the Lembang Fault exhibits a slip rate of approximately 2 to 3 millimeters per year (Daryono, 2019). Although this movement is classified as slow, it can lead to the accumulation of tectonic stress over time, which, if released suddenly, has the potential to trigger a major earthquake.

In a broader context, Indonesia is one of the most disaster-prone countries in the world due to its geographical location within the Pacific Ring of Fire. The National Disaster Management Agency (BNPB) reported that in 2022, there were 2,773 disaster events across the country. These events were dominated by floods (856 occurrences), followed by extreme weather (836), landslides (443), forest and

land fires (526), tidal waves and abrasion (24), earthquakes (22), droughts (64), and volcanic eruptions (2) (BNPB, 2022). A significant proportion of disaster victims are children, underscoring their heightened vulnerability during emergency situations.

Children, particularly those in elementary school, represent a demographic that is highly susceptible to disaster-related harm. This is supported by Government Regulation No. 21 of 2008, which recognizes children and women as vulnerable populations in disaster contexts. One of the primary reasons for this vulnerability is the limited awareness and understanding that children have about the risks in their environment. This knowledge gap often stems from a lack of targeted disaster education and preparedness programs tailored to their developmental level (Yustisia, 2019). According to Indriasari (2016), early disaster education is essential as it equips children with the necessary knowledge and practical skills to respond effectively during emergencies, thereby reducing the risk of injury or death.

From a developmental perspective, children in elementary school have reached a cognitive stage where they are capable of logical thinking and understanding cause-effect relationships. This makes them receptive to structured learning about natural disasters, including earthquakes. When earthquake preparedness education is delivered in an age-appropriate manner, children can learn to recognize signs of danger, recall safety procedures, and take appropriate self-protective actions during an emergency (Anwar, 2019).

Effective disaster education for children must be supported by suitable learning media. A variety of educational tools can be utilized, including printed materials like leaflets and posters, oral storytelling, and visual aids such as PowerPoint presentations and videos. Among these, audiovisual media has shown strong potential in enhancing children's understanding and retention of disaster preparedness information. Audiovisual learning combines both sound and visual elements, which can improve engagement and facilitate deeper comprehension of complex topics (Rudianto & Octaviani, 2021). For instance, animated videos depicting earthquake scenarios, evacuation routes, and safety actions provide children with concrete illustrations of what to expect and how to respond, making abstract disaster concepts more accessible and relatable.

Multimedia-based education leverages technology to deliver content in a dynamic and interactive way. By using videos, animations, and simulations, educators can present realistic scenarios that help children mentally prepare for actual disaster situations. Previous studies have indicated that students who receive education through audiovisual media demonstrate greater improvements in knowledge and preparedness compared to those taught using conventional methods. This is because visual and auditory stimuli together enhance attention, emotional engagement, and memory recall—key factors in educational effectiveness for young learners.

In addition to being effective, audiovisual media is also practical. It can be used in various settings, such as classrooms, community centers, and during school disaster preparedness programs. It is especially useful in areas with limited access to professional trainers or printed materials. Moreover, audiovisual content can be replayed, allowing children to revisit and reinforce their learning at their own pace.

The purpose of this study is to determine the effectiveness of using animated audiovisual materials and earthquake simulation activities in improving disaster preparedness among elementary school students. By evaluating the impact of these interventions on students' knowledge and readiness, this study aims to contribute to the development of effective, engaging, and age-appropriate disaster education programs. The findings are expected to inform educators, policymakers, and disaster management practitioners about the potential of multimedia-based learning as a strategy to enhance safety and reduce vulnerability in school-age children.

METHODS

Study Design

This study is a quasy experimental quantitative design research. This study used a pre-post test design for one group.

Population and Sample

Population of this study was student at one Elementary School that located in rural area of Bandung City, West Java, Indonesia. Sample size was calculate using G-Power software version 3.1.9.7 using t-test, means: difference between two independent means (two groups), assuming two tails, α = 0.05, effects size: 0.45, power level: 0.95, plus attrition rate, and the number of samples was 60.

Instrument

The data collection utilized the Earthquake Disaster Preparedness Knowledge Questionnaire, a tool designed to evaluate individuals' understanding of earthquake preparedness. This questionnaire serves as a general educational instrument, comprising 15 multiple-choice items that address key aspects of earthquake awareness, preparedness, and response.Each item is scored with 1 point for a correct response, and the total score is calculated by summing all correct answers, yielding a maximum possible score of 15 points. A higher total score indicates greater knowledge and preparedness for earthquake-related emergencies.

The questionnaire's reliability was assessed, with coefficients exceeding 0.7, signifying acceptable internal consistency.

Protocol Intervention

Preparation Phase: 1 week before the intervention

Materials Preparation: Create disaster simulation videos that specifically demonstrate earthquake scenarios, including how to identify earthquake signs, safe behaviors during an earthquake, Evacuation routes and proc edures.Arrange seating to ensure all students have a clear view of the video screen. Ensure audiovisual equipment (e.g., projector, speakers) is in good working condition.

Intervention Phase:

Introduction (5–10 minutes) : Welcome the students and introduce the session's purpose. Highlight the importance of earthquake preparedness and staying safe during disasters. Briefly explain what students will learn and how it applies to their daily lives. Encourage active participation and assure them they can ask questions during the discussion. Video Presentation (10–15 minutes) and Discussion (15–20 minutes). Feedback Collection (5–10 minutes): Distribute a short feedback form to gather students' thoughts on the session and what they learned.

Data Analysis

The data was analyzed used Wilcoxon test.

RESULTS

Table 1 Characteristic Data of the Respondents (N= 60)

Variable	Frequency	Percentage (%)
Age	31	51.7
10 years	29	48.3
11 years		
Gender		
Male	20	33.3
Female	40	66.7

The demographic profile of the 60 respondents participating in this study is presented in Table 1. The age distribution reveals that the participants consisted of children aged 10 and 11 years, reflecting the upper elementary school level. Specifically, 31 students (51.7%) were 11 years old, while 29 students (48.3%) were 10 years old. This relatively balanced distribution of age indicates that most students were at a similar stage of cognitive and emotional development, which is a critical consideration when implementing and evaluating educational interventions such as disaster preparedness programs. Children at this developmental stage typically have the cognitive ability to understand cause-and-effect relationships and can apply basic safety concepts in practical situations.

Regarding gender, the majority of respondents were female. Of the total 60 students, 40 were female (66.7%), and 20 were male (33.3%). The higher proportion of female participants may influence group dynamics and responsiveness to the intervention, particularly since gender differences can affect learning preferences, communication styles, and engagement with audiovisual materials. This variation

should be acknowledged when interpreting the effectiveness of the educational strategy used. Overall, the demographic composition of the respondents reflects an appropriate target group for disaster preparedness education. Their age and developmental stage make them well-suited to receive structured instruction about emergency response, and their participation provides valuable insight into how such programs can be adapted for young learners.

Table 2 Pre and Post-test of knowledge and Attitude (N=60)

Variable	Pre test	Post Test
Knowledge		
Good	1 (1.7 %)	60 (100 %)
Poor	59 (98.3 %)	0 (0 %)
Attitude		
Good	1 (1.7 %)	60 (100 %)
Poor	59 (98.3 %)	0 (0 %)

Table 2 illustrates the changes in knowledge and attitude levels of the 60 respondents before and after receiving the animated video and disaster simulation intervention. The results show a significant improvement in both domains. Prior to the intervention, only 1 respondent (1.7%) demonstrated a good level of knowledge about earthquake preparedness, while the vast majority, 59 respondents (98.3%), were categorized as having poor knowledge. Following the intervention, all 60 respondents (100%) reached the "good" category, indicating a complete shift in the students' understanding of disaster preparedness. A similar pattern was observed in the attitude domain. Before the intervention, only 1 student (1.7%) exhibited a positive or good attitude toward disaster preparedness, whereas 59 students (98.3%) had a poor attitude. After the intervention, 100% of the participants (60 students) showed a good attitude. These findings suggest that the use of animated audiovisual media and disaster simulations was highly effective in improving both knowledge and attitudes among elementary school students. The dramatic shift from poor to good scores across all respondents indicates that such educational interventions are not only engaging but also impactful in enhancing disaster preparedness among children.

Table 3 Bivariate Analysis (N=60)

Variable	**Pre-test (Mean ± SD)**	**Post-test (Mean ± SD)**	**T**	**P-Value**
Preparedness	**5.30 (±1.465)**	**15.43 (± 0.593**	**-6.851b**	**0.000**

Table 3 presents the results of the bivariate analysis examining the differences in students' preparedness scores before and after the intervention using animated videos and disaster simulations. The data show a substantial increase in preparedness levels following the educational intervention. Before the intervention, the average preparedness score was 5.30 with a standard deviation of ±1.465. After the intervention, the mean score rose significantly to 15.43 with a much lower standard deviation of ±0.593. The difference between pre- and post-test scores was analyzed using a paired t-test, yielding a t-value of -6.851 and a p-value of 0.000. The p-value is less than the standard threshold of 0.05, indicating that the improvement in preparedness scores is statistically significant. This result confirms that the combination of animated audiovisual education and disaster simulation activities had a meaningful impact on enhancing disaster preparedness among elementary school students. The considerable increase in the mean score also suggests that the intervention was not only statistically significant but also practically effective in transforming students' understanding and readiness to respond to earthquake disasters.

DISCUSSION

The results proves that after being given information using audio visual media about disaster management, there has been an increase in knowledge of student preparedness in dealing with earthquake disasters. One factor that affects student preparedness is the knowledge factor. Knowledge of disaster preparedness can be improved through the provision of disaster management training (Saparwati, Trimawati, and Wijayanti 2020). This research is in accordance with the literature which states that the level of education also determines a person's ability to understand the knowledge obtained, namely the higher a person's level of education, the easier it is for a person to receive information Based on the theory that at the age of 9-13 years, children have critical thinking and their curiosity about everything deeply and like to ask questions. Therefore, with their very high curiosity, this is the right time to provide education about earthquake disaster preparedness regarding the steps that must be taken when an earthquake occurs in school-age children, because children can already think critically when given education.

Based on research conducted on children of precautionary attitude after the simulation of self-rescue during an earthquake, the results were obtained that most children (75%) have a positive attitude of preparedness, in line with research conducted by Yustisia et al (2019) most of the children who have participated in simulation training have a positive attitude, the majority of research respondents with a proportion of 85.5%, namely 53 school-age children are very prepared to face disasters earthquake after being given a simulation of facing an earthquake. This is in accordance with the ongoing intellectual stage in school-age children, where at this stage it demands children's cognitive abilities that can develop pictorial patterns. Attitudes in dealing with earthquake disasters are preparedness because attitudes are related to personality perceptions and motivations, and attitudes are part of the disaster management process (Tyas, Lestari, & Susilowati, 2020). Children are one of the most fatalities during disasters in Indonesia, this is due to the lack of children's preparedness attitude in dealing with earthquake disasters with this attitude can reduce the number of school-age children who die due to earthquake disasters.

From the results of the research (2018) states that Simulation is a way of presenting learning experiences by using simulated situations to understand certain concepts, principles or skills.In this study, using video media that is presented with animation in it, if shown to students, students will feel interested in what they see so that they can make students more active and understand learning, according to research (Yanti and Fitria 2019) states that, "Video media is everything that allows audio signals to be combined with moving images sequentially".

CONCLUSION

This study concludes that earthquake disaster simulation videos significantly improve disaster preparedness among elementary school students. The use of animated videos enhances student engagement, simplifies teacher-student interaction, and makes the learning process more effective. Students better understand the material, and teachers spend less time repeating explanations.

Recommendation for school Incorporate disaster simulation videos and other audiovisual tools into the regular curriculum to enhance disaster preparedness among students.

REFERENCES

Akibat Aktivitas Sesar Lembang Di Kabupaten Bandung Barat." *Region : Jurnal Pembangunan Wilayah dan Perencanaan Partisipatif* 18(2): 357.

BMKG. 2019. "BMKG." bmkg. https://bbmkg3.bmkg.go.id/tentang-gempa.

BNPB. 2020. "National Disaster Management Agency 2020." BNPB. https://bnpb.go.id/berita/refleksi-peristiwa-sepanjang-2020-tetap-waspada-potensi-gempa. "BNPB 2023." *BNPB*. https://bnpb.go.id/potensi-ancaman- bencana.

Daryono. 2019. "Earthquake Geology of the Lembang Fault, West Java, Indonesia." 751: 180–91. https://doi.org/10.1016/j.tecto.2018.12.014.

Hidayat fahrul, et al. 2022. "The Effect Of Education With Animated Videos On The

Preparedness Of Elementary School Children In Facing The Earthquake Disaster At Sdn 1 Ketewel, Sukawati, Gianyar In 2022.": 31–41.

Imam Wahyudi. "Awareness of Preparedness Simulation Methods in Dealing with Disasters." https://id.scribd.com/document/371493573/Bab-111-Imam.

Indriasari, Fika Nur. 2018. "The Effect of Earthquake Disaster Preparedness Simulation Method on Children's Preparedness in Yogyakarta." Soedirman Journal of Nursing 11(3): 199.

Istiroha, and Ahmad Hasan Basri. 2020. "Preparedness Training with Power Point Media and Video Media in Improving Flood Disaster Preparedness in High School Students." Journal of Nears Comunitty 11(2): 202–15.

Kinasih, Farah Achyani, Nur Miladan, and Kusumastuti Kusumastuti. 2023. "Kajian Risiko Bencana Gempa Bumi

Mahmudah, Susi, and Farah Fauzia. 2022. "Penerapan Model Simulasi Tentang Pembelajaran Mitigasi Bencana Alam Gempa Bumi Berbasis Video Animasi Untuk Meningkatkan Hasil Belajar Siswa." *Jurnal Basicedu* 6(1): 633–45.

Narayana, I Gede Agus, I Made Sukarja, I Wayan Sukawana, and Ni Made Juniari. 2022. "Audiovisual Media Education Increases Student Preparedness in Facing." Journal of Nursing Gema |Volume 15(2): 160–71. https://ejournal.poltekkes-denpasar.ac.id/index.php/JGK/article/download/1869/860.

Oktavia, Linda Sari, Neviyarni, and Irdamurni. 2021. "Elementary School Age Child Development: A Study for Lower Grade Students." Tambusai Education Journal 5(1): 1823–28.

Rudiyanto, R, R Oktaviani, and ... 2021. "The Effect of Disaster Simulation Videos on Improving Preparedness and Knowledge of Tsunami Disaster Firts Aid in Junior High School Students." Metro Health Journal... 14: 1–10. http://www.ejurnal.poltekkes-tjk.ac.id/index.php/JKM/article/view/2666.

Saparwati, Mona, Trimawati, and Fiki Wijayanti. 2020. "Increasing Knowledge of Disaster Preparedness with Animated Videos in School-Age Children." Pro Health Journal of Health Sciences 2(1): 23–28. http://jurnal.unw.ac.id:1254/index.php/PJ/article/download/22-28/pdf.

Sari, Devi Permata, and Fitri Suciana. 2019. "The Effect of Audio Visual Education and Role Play on Disaster Preparedness Behavior in Elementary School Children." Journal of Holistic Nursing Science 6(2): 44–51.

Setiawan n. 2022. "Klasterisasi Wilayah Rentan Bencana Alam Berupa Gerakan Tanah Dan Gempa Bumi Di Indonesia." https://www.researchgate.net/publication/365677736_Klasterisasi_Wilayah_Rentan_Bencana_Alam_Berupa_Gerakan_Tanah_Dan_Gempa_Bumi_Di_Indonesia.

Siswi, Dinda, Baskoro Setioputro, and Wantiyah. 2023. "The Effectiveness of Audiovisual Media Health Education on Flood Disaster Preparedness in Elementary School Children." *Jurnal Kegawatdaruratan Medis Indonesia* 2(1): 26–42.