JCSH

JOURNAL OF COMMUNITY SERVICE FOR HEALTH

http://ojs.phb.ac.id/index.php/jcsh

Improving Preparedness Through Earthquake Disaster Simulation Activities for Elementary School Student

[CA]Sri Haryuni[1], Ani Sutriningsih[2], Indah Jayani[1], Susmiati[1], Erik Irham Lutfi[1], Devangga Darma Karingga[1]

[1]Universitas Kadiri, Indonesia

[2]Universitas Tribuwana Tunggadewi, Indonesia

[CA]Coresponding Author

Article Information

History Article:
Received, 06/11/2025
Accepted, 24/11/2025
Published, 28/11/2025

Keywords:
Disaster, Earthquake, Preparedness, Simulation, Students

Abstract

Earthquakes are one of the natural disasters that frequently occur in Indonesia and claim many lives. Kediri City is an earthquake-prone area because it is home to one of the active volcanoes, Kelud Mountain. Children are among the vulnerable groups most at risk of being affected by disasters. Preparedness is important to be provided early to provide understanding and guidance on the appropriate steps to take when a threat occurs to reduce disaster risk. This community service activity aimed to determine the effect of simulation on earthquake disaster preparedness among students of SDN Pojok 2, Kediri City. The method used a pre-experimental one-group pre-test and post-test design. The samples were taken using cluster random sampling and the sample size used was 46 students. The preparedness data were collected using a questionnaire. The data analysis used the Wilcoxon test. The results of the activity showed that the level of preparedness before the disaster simulation was almost entirely low (80.5%), the level of preparedness after the disaster simulation was almost entirely high (86.9%), and there was an effect of simulation on earthquake disaster preparedness among students of SDN Pojok 2, Kediri City (ρ = 0.000). Preparedness simulations have significantly improved elementary school students' disaster preparedness. Therefore, it is hoped that disaster management simulations can be implemented in all schools in Kediri City, with training provided to elementary school teachers.

✉Correspondence Address:
Universitas Kadiri – East Java, Indonesia
Email: sri.haryuni@unik-kediri.ac.id

E-ISSN: 2746-5195
DOI: https://doi.org/10.26699/jcsh.v6i2.1282

INTRODUCTION

SDN Pojok 2 is one of the schools located in Pojok Village. Based on the results of a preliminary study, there has been no earthquake disaster management simulation for its students, so education related to earthquake preparedness is needed to minimize the impact of an earthquake. Improved preparedness can be improved, one of which is by providing education through earthquake disaster simulations. Earthquake disaster simulations need to be carried out because with simulations, students can directly practice when an earthquake occurs, whereas previously, SDN Pojok students had never directly practiced when an earthquake occurred.

Earthquakes are a common natural disaster in Indonesia, claiming many lives. They can cause physical, mental, and social damage to communities (Rostami-Moez et al., 2020). Earthquakes can occur suddenly and without warning. They are sharp, violent tremors caused by the movement of tectonic plates along fault lines in the Earth's crust. Earthquakes can cause ground shaking, landslides, landslides, fissures, ocean fires, and tsunamis (Sahayati et al., 2025). Earthquakes can have both immediate and long-term impacts on health. These include secondary infections from untreated wounds; increased morbidity and the risk of complications related to pregnancy and childbirth due to disruption of obstetric and neonatal services; potential risks of infectious diseases, especially in areas affected by fatigue; increased chronic illness and the risk of complications due to treatment interruptions; increased psychosocial needs; and potential environmental contamination by chemical/radiological agents following damage to industrial infrastructure.

Indonesia is a country with a geographically diverse mountainous landscape and is the only country in the world with a bottomless inter-island sea between two island arcs, which are at high risk of frequent earthquakes (Ayuningtyas et al., 2021). Kediri City is one of the areas at high risk of earthquakes due to its proximity to an active volcano, Kelud Mountain. The Kediri Regional Disaster Management Agency (BPBD) reported that Kelud Mountain erupted on February 13, 2014, at approximately 10:50 PM WIB. This eruption was quite powerful, affecting Yogyakarta. The eruption killed four people and displaced hundreds of thousands. This demonstrates the importance of disaster preparedness (Haryuni Sri, 2020). The disaster management cycle has four phases: mitigation, preparedness, response, and recovery. Preparedness is the most important phase in the disaster management cycle (Rostami-Moez et al., 2020).

Preparedness is an action taken to anticipate disasters by taking quick and effective action to reduce the negative impacts of disasters, including loss of life (Cahyani & Triyono, 2025). Disaster preparedness must be possessed by the community, including the elderly, pregnant women, and children, to reduce the number of victims affected by disasters. Pojok Village is an area in Kediri City that has a high risk of earthquakes due to its proximity to Kelud Mountain. During the eruption of Kelud Mountain, which caused extensive damage to many infrastructures, there were victims and the collapse of mobility and activities in various sectors in Kediri City. To prevent the impact of this risk from recurring and even minimize it, we need to remain vigilant and have sufficient supplies for self-rescue, including survival. Kediri City has several shopping centers, service centers, and public spaces frequently visited by the community. So, the community service team carried out community service by providing disaster management simulations to students at SDN Pojok 2, Kediri City.

METHOD

The activity was carried out as a pre-experimental study using a one-group pre- and post-test design. The population was all students at SDN Pojok 2, Kediri City. The sampling technique used a cluster random sampling, with a sample size of 46 students. The Wilcoxon test was used to assess the effect of the disaster management simulation on student preparedness. The community service program was conducted at SDN Pojok 2, Kediri City. The implementation stages used in this community service were measuring earthquake disaster preparedness before the disaster simulation (pre-test) using a valid and reliable questionnaire among students at SDN Pojok 2, Kediri City and poviding an earthquake disaster simulation using video media. Validity tests were conducted using product moment correlation and reliability tests using Cronbach's Alpha. The simulation lasted 45 minutes, beginning with an explanation of the

material and followed by the earthquake disaster simulation then a 30-minute discussion and Q&A session with the community service team and followed by measuring earthquake disaster preparedness after the disaster simulation (post-test) among students at SDN Pojok 2, Kediri City.

Picture 1. Presentation of Material and Simulation

RESULTS

A community service activity was held at SDN Pojok 2, Kediri City, on May 16, 2025. Forty-six students attended the activity. The material presented in the community service activity included the definition, causes, signs, and things to consider before, during, and after an earthquake. The next step was an earthquake disaster simulation.

The following is general data on respondents based on gender, parental education, parental occupation, and previous experience obtaining information about earthquakes.

Table 1. Frequency Distribution of General Respondent Data (n=46)

Characteristics	n	Percentage %
Gender		
Male	20	43.5
Female	26	56.5
Parents' education		
Primary (SD-SMP)	30	65.2
Middle (SMA)	14	30.4
High (College)	2	4.4
Parents' occupation		
Civil servant	2	4.4
Self-Employed	12	26.1
Trader	19	41.3
Others	13	28.2
Receive information		
Yes	0	0
Not yet	46	100

Source: Primary Data

Table 1 shows that the majority of respondents were female (56.5%), the majority of parents had primary education (65.2%), the majority of parents were traders (41.3%), and all had never received information regarding what to do during an earthquake. The following data shows the level of preparedness of respondents before and after the earthquake disaster simulation.

Table 2. Data on Respondents' Level of Preparedness Before and After the Earthquake Disaster Simulation (n=46)

Variable	Category	Percentage	
		Pre (%)	Post (%)
Preparedness	Low	37(80.5%)	0(0%)
	Middle	9(19.6%)	6(13.1%)
	High	0(0%)	40(86.9%)
p value = 0.000	α = 0.05		

Source: Primary Data

Table 2 shows that students' preparedness in facing earthquake disasters before being given a disaster simulation was almost entirely low (80.5%) and preparedness after being given a disaster simulation was almost entirely high (86.9%). Based on the results of the Wilcoxon Test, the ρ value was $0.000 < \alpha$ (0.05) so that the results showed that there was an influence of earthquake disaster simulation on the preparedness of students of SDN Pojok 2, Kediri City in facing earthquake disasters.

DISCUSSION

Student Preparedness before the Earthquake Disaster Simulation

The results of measuring the level of student preparedness before the disaster simulation showed that almost all students had low levels of preparedness and after the disaster simulation showed that almost all students had a high level of preparednes. This low level of disaster preparedness among students is reflected in indicators of knowledge and attitude. Disaster preparedness among elementary school children is influenced by internal and external factors. Internal factors include the child's health and psychological state. External factors include the school environment, family and community, and government and community support. This could also be due to the fact that almost all students had never received information regarding earthquake disaster management. A lack of disaster information and literacy contributes to students' low levels of disaster preparedness. This lack of information and literacy can lead to students' knowledge and preparedness being less than in line with previous research, which is expected to foster strong and independent initiatives from teachers and the school environment to provide disaster risk reduction education (Astuti et al., 2025). It is also hoped that the government will pay attention to the successful implementation of the disaster-safe education program by improving mitigation in schools. Previous research has also found that the implementation of mitigation in schools is also affected by a lack of understanding of disaster management among teachers and students (Rofiah et al., 2021). Another factor contributing to low levels of student preparedness is the school environment (external). This is demonstrated by the lack of a subject in the elementary school curriculum and the lack of teacher education on disaster risk reduction. Previous research has highlighted the importance of integrating disaster risk reduction materials into local content and the personal development of elementary school students (Septikasari et al., 2022). Another influential factor is public education. The government plays a crucial role in improving disaster education in schools. This aligns with Irwanto's research, which states that schools play a crucial role in providing disaster mitigation education to elementary school-aged children (Irwanto et al., 2024; Widyasanti et al., 2024).

Student Preparedness after an Earthquake Disaster Simulation

The results of measuring the level of student preparedness after the disaster simulation showed that almost all students had a high level of preparedness. The high level of disaster preparedness among students was reflected in indicators of knowledge and attitude. Internal student factors related to age, as elementary school age cognitive abilities are well developed. Gender is another internal factor influencing preparedness. The majority of students were female. Previous research has shown that females tend to have stronger emotional empathy and attention to detail, making them more likely to understand complex topics such as disasters. This aligns with research showing a relationship between individual characteristics and disaster preparedness (Pamungkas, 2023). There was an increase in preparedness after being given a disaster simulation. Before being given a disaster simulation, students had a low level of preparedness, and after being given a disaster simulation, the level of preparedness of students increased to a high level. The level of preparedness of students increased after being given a disaster simulation because students experienced active and practical learning, which allowed students to better understand, analyze, and apply information. This is in line with research that states an increase in the level of disaster preparedness in elementary school children after a disaster simulation (Kharisna et al., 2023; Rahman et al., 2024). Knowledge, as an indicator of preparedness, increases because students are actively involved in the learning process, gain hands-on learning experiences, and become more motivated due to their active role in simulations. Previous research has shown that knowledge and

self-efficacy are related to disaster preparedness (Juvan et al., 2025; Pereira et al., 2022; Ringu et al., 2021). Simulations help transition knowledge from a theoretical level to a practical level, where students not only know, but are also able to do, explain, and analyze.

The Effect of Earthquake Disaster Simulation on Student Preparedness

The analysis results indicate an effect of earthquake disaster management simulation on the preparedness of students at SDN Pojok 2, Pojok Village, Kediri City. This demonstrates the importance of earthquake disaster simulations in improving student preparedness in the face of disasters. This aligns with previous research that suggests simulations are effective in improving students' disaster preparedness (Lestari et al., 2022; Wahyuni et al., 2025). It is hoped that such activities need to be encouraged and can be carried out for all teachers in the Kediri city area so that they can provide direct education to all students in their respective schools. Improving disaster preparedness capabilities is expected to reduce the impact of earthquake disaster risks that occur. Based on the community service activities carried out, it is hoped that it can have important implications for the national disaster education strategy by participating in empowering schools, teachers in providing structured disaster education to address the low level of preparedness in facing disasters, supporting the broader government agenda to build resilience in the educational environment. This can also be done by integrating disaster mitigation education into the school curriculum, ensuring school readiness to implement the government's disaster safety education program successfully.

Picture 2. Activity Documentation

CONCLUSION

The conclusions of this community service activity include: Prior to the disaster simulation (pre-test), most students had low levels of preparedness. Following the disaster simulation (post-test), most students had high levels of preparedness. There was an increase in preparedness after the disaster simulation. Before the simulation, 80.5% of participants had low levels of preparedness, while after the simulation, 86.9% had high levels of preparedness. The earthquake disaster simulation influenced the preparedness of students at SDN Pojok 2, Kediri City.

SUGGESTION

Simulation, as a disaster mitigation effort, is a crucial community service activity designed to improve the preparedness of elementary school students. This community service program does not end after the implementation period; there will be programs to support the implementation of the community service that has been carried out, including evaluation and monitoring of scheduled coaching programs conducted by the community service team for elementary school students. This monitoring and evaluation is expected to help elementary school students develop and become independent. This can also be done by integrating disaster mitigation education into the school curriculum, ensuring school readiness to successfully implement the government's disaster safety education program.

ACKNOWLEDGMENT

We would to give our appreciation to the students of SDN Pojok 2, Kediri City, who participated and contributed to the success of the community service activities.

FUNDING

This community service activities were funded by all of the authors.

CONFLICTS OF INTEREST

The authors declare no conflict of interest. Other funders than the authors had no role in the data collection, data analysis, and also in the writing of the manuscript.

REFERENCES

Astuti, V. W., Richard, S. D., & Aryanti, P. I. (2025). *Effect of Disaster Mitigation Education on Earthquake Preparedness Knowledge among*

Children with Special Needs. *6*(4), 645–655. https://doi.org/10.37363/bnr.2025.64520

Ayuningtyas, D., Windiarti, S., Sapoan Hadi, M., Fasrini, U. U., & Barinda, S. (2021). Disaster preparedness and mitigation in indonesia: A narrative review. *Iranian Journal of Public Health*, *50*(8), 1536–1546. https://doi.org/10.18502/ijph.v50i8.6799

Cahyani, W. N., & Triyono, T. (2025). *KESIAPSIAGAAN PSIKOLOGIS DEWASA AKHIR DI DAERAH RAWAN BENCANA ERUPSI MERAPI*. *5*(2), 622–635. https://doi.org/10.51878/cendekia.v5i2.4728

Haryuni Sri. (2020). Pengaruh pelatihan siaga bencana gempa bumi terhadap kesiapsiagaan anak usia sekolah dasar dalam menghadapi bencana gempa bumi di "Yayasan Hidayatul Mubtadiin Kediri. *Jurnal Ilmu Kesehatan*, *6*(2), 133–139. http://ejurnaladhkdr.com/index.php/jik/article/view/167/142

Irwanto, A., Arzani, M., & Rahayu, F. (2024). Peran Sekolah dalam Pendidikan Mitigasi Bencana pada Anak Usia Sekolah Dasar di SDN 4 Santong. *Arus Jurnal Psikologi Dan Pendidikan*, *32*, 80–84. https://doi.org/10.57250/ajpp.v3i2.506

Juvan, U., Sutriningsih, A., & Choeron, R. C. (2025). *Hubungan Pengetahuan Dengan Kesiapsiagaan Mahasiswa Keperawatan Dalam Menghadapi Situasi Bencana Gempa Bumi*. Universitas Tribhuwana Tungga Dewi Malang.

Kharisna, D., Wardah, W., Safitri, D., Andriyani, D., Masyita, S., Erica, L., & Gulo, W. A. (2023). Peningkatan Kesiapsiagaan Siswa Sekolah Dasar Dalam Menghadapi Bencana Gempa Bumi dan Kebakaran. *Jurnal Abdimas BSI: Jurnal Pengabdian Kepada Masyarakat*, *6*(2), 191–198. https://doi.org/10.31294/jabdimas.v6i2.14882

Lestari, S. A., Islaeli, I., Islamiah, I., Purnamasari, A., & Zoahira, W. O. A. (2022). Efektivitas Simulasi Bencana terhadap Kesiapsiagaan Bencana Gempa Bumi dan Tsunami pada Siswa SMPN 1 Soropia di Wilayah Pesisir Kecamatan Soropia Kabupaten Konawe. *Jurnal Surya Medika (JSM)*, *8*(3), 258–262. https://doi.org/10.33084/jsm.v8i3.4131

Pamungkas, S. Y. (2023). *Hubungan Karakteristik Kepala Keluarga dengan Kesiapsiagaan Kepala Keluarga di KRB III Desa Sidorejo Kecamatan Kemalang* [Universitas Muhammadiyah Klaten]. http://repository.umkla.ac.id/id/eprint/3192

Pereira, G. P. A. ., Sutriningsih, A., & Metrikayanto, W. D. (2022). *Hubungan Efikasi Diri Dengan Kesiapsiagaan Menghadapi Bencana Tanah Longsor Di Dusun Gondang Kecamatan Bumiaji Kota Batu*. Universitas Tribhuwana Tunggadewi.

Rahman, F. ., Permadi, A., & Hasrian, H. (2024). Meningkatkan Kesiapsiagaan Warga Sekolah dalam Menghadapi Bencana Gempabumi dan Kebakaran di SDN Petukangan Utara 10. *Jurnal Relawan Dan Pengabdian Masyarakat REDI*, *1*(4), 113–124. https://doi.org/10.69773/1rb3w196

Ringu, A. ., Sutriningsih, A., & Choeron, R. . (2021). *Hubungan Simulasi Gempa Bumi Dengan Self Efficacy Dalam Menghadapi Gempa Bumi pada Siswa Kelas V Di SDN Pandansari 2 Kabupaten Malang*. Universitas Tribhuwana Tunggadewi.

Rofiah, N. H., Norimune, K., & Hayati, E. N. (2021). *Key elements of disaster mitigation education in inclusive school setting in the Indonesian context*. *13*(1), 1–8. https://doi.org/10.4102/jamba.v13i1.1159

Rostami-Moez, M., Rabiee-Yeganeh, M., Shokouhi, M., Dosti-Irani, A., & Rezapur-Shahkolai, F. (2020). Earthquake preparedness of households and its predictors based on health belief model. *BMC Public Health*, *20*(1), 1–8. https://doi.org/10.1186/s12889-020-08814-2

Sahayati, S., Rahmuniyati, M. E., & Mardani, S. (2025). Students' Preparedness Level To Facing an Earthquake Disaster in Yogyakarta, Indonesia: a Cross-Sectional Study. *Journal of Public Health Research and Community Health Development*, *8*(2), 166–174. https://doi.org/10.20473/jphrecode.v8i2.55447

Septikasari, Z., Retnowati, H., & Wilujeng, I. (2022). Pendidikan pencegahan dan pengurangan risiko bencana (PRB) sebagai strategi ketahanan sekolah dasar dalam penanggulangan bencana. *Jurnal Ketahanan Nasional*, *28*(1), 120–143.

https://doi.org/10.22146/jkn.74412

Wahyuni, A., Syam, I., & Bahri, N. A. (2025). Efektifitas Tabletop Disaster Excercise dalam meningkatkan Kesiapsiagaan Bencana Banjir pada Siswa Sekolah Dasar Kota Makassar. *Jurnal Mitrasehat*, *15*(2), 950–956. https://doi.org/10.51171/jms.v15i2.513

Widyasanti, A., Galuh, A. ., Febriany, F., Jayadi, N. ., Alifah, N., & Azzahra, S. . (2024). Sosialisasi dan Simulasi Mitigasi Bencana Gempa Bumi di SDN 271 Panghegar Kota Bandung. *BERNAS: Jurnal Pengabdian Kepada Masyarakat*, *5*(2), 1314–1320. https://doi.org/10.31949/jb.v5i2.8350