



THE EFFECT OF DISASTER PREPAREDNESS TRAINING ON EARTHQUAKE PREPAREDNESS AT SDN MADANI PALU

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ABSTRACT

Background: Central Sulawesi has a high potential for large-scale disasters such as earthquakes, tsunamis, and liquefaction which can lead to severe physical damage and a high death toll. It is estimated that 60–70% of Indonesia's disaster victims are women, children, and the elderly. Due to their lack of independence, children are among the most vulnerable populations affected by natural disasters. As a result, efforts are required to raise kids' awareness of natural disaster preparedness. This research aims to analyze the effect of disaster preparedness training on elementary school children's preparedness for earthquakes.

Method: This study applied a quasi-experimental research, particularly the Nonequivalent Control Group Design. In this case, the samples involved are 40 students of SDN Madani Palu. Furthermore, the test used is the Wilcoxon test and the Mann Whitney test with a significance level of $p < 0.05$.

Results: The study's findings revealed a Mann Whitney U-Test score of $p = 0.314$ ($p > 0.05$), indicating that both the treatment and control groups were equally prepared for earthquakes. However, the post-observation data revealed a p value of 0.000 ($p < 0.05$), indicating a significant difference between the treatment and control groups' levels of earthquakes disaster preparedness.

Conclusion: This indicates that improving the level of preparedness for earthquakes disasters is a result of providing SDN Madani Palu children with disaster preparedness training that includes lecture, audio-visual, and simulation methods. It can be concluded that there is an effect of disaster preparedness training on the preparedness of elementary school children for earthquake disasters

BACKGROUND

A disaster is an occurrence that poses a threat to human life and can be caused by human, natural, or non-natural factors. It can further result in fatalities, property loss, environmental damage,

or psychological effects (Dewan Perwakilan Rakyat RI, 2007). Large-scale natural disasters including earthquakes, tsunamis, and liquefaction, which result in significant physical damage and fatalities, are highly likely to occur in Central

Sulawesi Province. There are about thirty active faults in Central Sulawesi Province, with the Palu Koro fault being the most notable and has caused a huge earthquake at 7.4 SR, leading to liquefaction and tsunami on September 28th, 2018 (Sianipar, 2023). Since the occurrence of earthquake disasters cannot be predicted, efforts to mitigate their effects must be made to improve readiness and lower risk before, during, and after the disaster (Hari et al., 2021).

Children and teenagers are the most vulnerable to the physical and psychological effects of natural disasters. Their lack of awareness of the dangers surrounding them makes them more vulnerable to disasters and makes them ill-prepared for coping with them. According to the most recent data from the United Nations International Strategy for Disaster, up to 60% of children worldwide are victims of natural disasters. In addition, according to a statement made by Lilik Kurniawan, the Director of Community Empowerment at the National Disaster Management Agency (BNPB), 60 to 70% of disaster victims in Indonesia are women, children, and the elderly (Ansori & Santoso, 2020). Due to their lack of independence, children are among the most vulnerable populations to the effects of natural disasters. As a result, efforts are required to raise children's preparedness for dealing with disasters (Ratchna et al., 2019).

Schools play a big part in educating children about disasters. Research indicates that while disaster education is helpful in many nations, it is still insufficient. Typical program issues include inadequate funding, policy gaps, a shortage of equipment, and a lack of instructor expertise. Given the rising frequency of natural disasters, some disaster education programs mentioned are of

low quality, which might leave kids ill-prepared for emergencies and thus put their health at risk (Seddighi et al., 2021). In this case, disaster preparedness is an effort made to get oneself, one's family, and the community around them ready for the possibility of natural disasters. It is anticipated that preparedness for disasters will reduce the number of fatalities, injuries, and damage to infrastructure (Mutiarasari, 2022).

Integrated Model Elementary School (SDN) of Madani Palu is one of the Elementary Schools in Palu City that has never conducted disaster preparedness training aimed at increasing the preparedness of elementary school children in facing earthquakes that can occur at any time without being able to predict when they will occur. Being ready for this tragedy is the first step toward reducing significant material and human casualties. First aid and evacuation skills are just two examples of the information and attitudes that every person has to have in order to be prepared for a disaster.

METHODS

This study used a Quasi Experimental design with a Nonequivalent Control Group Design, involving two groups, namely the experimental group and the control group that are not randomly selected. Both groups received a pre-test to measure their readiness to face the earthquake before the intervention. In the experimental group, disaster preparedness training was carried out by lecture, audio-visual, and simulation methods. The duration of the training is 120 minutes which is divided into three sessions. The first session was a 30-minute lecture, where the instructor provided basic material on

earthquake preparedness, including emergency measures and the importance of preparedness. The training instructor is a disaster mitigation expert who is experienced in school preparedness training.

Furthermore, the second session was in the form of audio-visual for 30 minutes, using disaster education videos that showed self-rescue steps during an earthquake. This audio-visual media aims to improve students' visual understanding of preparedness steps. The third session was a 60-minute simulation in which students participated directly in an earthquake simulation under the guidance of an instructor. This simulation was carried out in stages, starting from evacuation to a safe point to basic post-earthquake handling, so that students could practice the material that had been delivered in the lecture and audio-visual sessions.

The control group only received lecture and audio-visual methods without any simulation. After the training, both groups underwent a post-test to assess changes in the level of preparedness for earthquake disasters. The research sample was selected by the nonprobability sampling method using the purposive sampling technique, involving 40 students who met the research criteria.

RESULTS

Results of the current study revealed the frequency distribution of respondents involved as shown in Table 1. In terms of the characteristics of the respondents, most of the respondents in both treatment and control groups aged 11 years old by

15 people (75.0%) in treatment group and 17 people (85.0%) in control group. Meanwhile, in terms of gender, both groups were dominated by female by 11 people (55.5%) in treatment group and 12 people (60%) in the control group.

Based on the data analysis results shown in Table 2, the mean value of respondents' preparedness in the treatment group before treatment is 8.15 with a standard deviation of 1.14, while after treatment is 9.60 with a standard deviation of 0.83. This indicates that there was an increase in the mean value of the preparedness by 1.45 after disaster preparedness training was provided through with lecture, audio-visual and simulation methods. Furthermore, the results of data analysis using the Wilcoxon test showed a p Value (Sig) of 0.000, proving that providing disaster preparedness training with lecture, audio-visual and simulation methods to elementary school children has an effect on increasing preparedness for earthquake disasters. Furthermore, Table 3 shows the mean value of the preparedness of the control group respondents, in which before treatment was provided, the value is 9.35 with a standard deviation of 0.67, while after the treatment, the mean value is 9.60 with a standard deviation of 0.50. This illustrates that there is an increase in the average preparedness of 0.25 after disaster preparedness training was provided through the lecture method and audio visual without simulation. In this case, the results of data analysis using the Wilcoxon test showed a p Value (Sig) of 0.06, thus it is proven that providing disaster preparedness training with the lecture method and audio visual without simulation to SDN Madani children has no effect on increasing preparedness for earthquake disasters.

In addition, Table 4 shows the data that during the pre-observation, the preparedness for facing the earthquake disaster of respondents in the treatment group and the control group was not different. This can be seen from the results of the Mann Whitney U-Test with a value of $p = 0.314$ ($p > 0.05$), indicating that the preparedness for facing the earthquake disaster of the treatment and

control groups is the same. Meanwhile, the results of the post-observation showed a value of $p = 0.000$ ($p < 0.05$), indicating that the preparedness for facing the earthquake disaster of the treatment and control groups is very different. This shows a significant effect of disaster preparedness training on the preparedness for facing the earthquake disaster of SDN Madani Palu children.

Table 1. Frequency distribution of respondents' characteristics based on age and gender at SDN Model Terpadu Madani Palu

Characteristics	Treatment Group		Control Group	
	Total (n)	Frequency (f)	Total (n)	Frequency (f)
Age				
10 years			1	5.0
11 years	15	75.0	17	85.0
12 years	5	25.0	2	10.0
Total	20	100	20	100
Gender				
Male	9	45.0	8	40.0
Female	11	55.0	12	60.0
Total	20	100	20	100

Table 2. Differences of mean value of respondents' preparedness in facing earthquake disaster before and after the provision of treatment on treatment group at SDN Model Terpadu Madani Palu

Variabel	N	Mean \pm s.b.	Min-Max	p
Preparedness before treatment	20	8.15 \pm 1.14	6-10	0.000
Preparedness after treatment	20	9.60 \pm 0.83	7-10	

Table 3. Differences of mean value of respondents' preparedness in facing earthquake disaster before and after the provision of treatment on control group at SDN Model Terpadu Madani Palu

Variable	N	Mean \pm s.b.	Min-Max	p
Preparedness before treatment	20	9.35 \pm 0,67	8-10	0.06
Preparedness after treatment	20	9.60 \pm 0.50	9-10	

Table 4. Differences of mean value of respondents' preparedness on both treatment and control group during pre-observation and post-observation

Observation	Treatment	Control	Mean Differences	p
Pre	8.15	9.35	-1.20	0.314
Post	9.60	9.60	0.00	0.000

DISCUSSION

Based on the results of the study, the value of the elementary school children's preparedness variable for facing earthquakes between before and after the disaster preparedness intervention experienced an increase in the treatment group. The difference in the mean value of elementary school children's preparedness for facing earthquakes before and after the intervention using the Wilcoxon test in the treatment group has a p value = 0.00 (<0.05). This indicates that there is a significant difference in the preparedness score before and after the intervention. In other words, the provision of disaster preparedness training interventions using lecture, audiovisual and simulation methods has a significant effect on elementary school children's preparedness for facing earthquakes.

According to Virgiani et al (2022), training in disaster preparedness has a big impact on being ready when disaster occurs. When a disaster strikes quickly, it is crucial for students to be prepared in order to safeguard both themselves and other people. Previous study discovered that there was a significant increase in the capacity of both knowledge and skills of students towards earthquake and tsunami disaster preparedness in the school community at SMP Negeri 13 Padang after education about disaster preparedness was provided (Roza et al., 2020).

To reduce a disaster's harmful effects, high-quality disaster education is essential. The best facilities and technology must be used for active learning, curricula and textbooks must be updated by studying nations that have successfully managed disasters, outdoor education benefits must be utilized, as well as the knowledge of private citizens and authorized institutions, and

proper implementation of school-based disaster education is essential (Görkem, 2022).

Buston et al (2022) in their research findings underlined the importance of using innovative educational tools to improve disaster preparedness among vulnerable populations, especially children. By improving their knowledge and attitudes, such interventions can lead to more effective actions during emergencies, ultimately contributing to better safety outcomes in disaster-prone areas.

One of the innovations in disaster preparedness education is by utilizing mobile phone technology. In this case, android-based earthquake games have a good effect on students' knowledge concerning disaster preparedness. Such application is a better medium than other media, such as books, presentation slides, or simulation videos. This is an effective and efficient learning medium that can increase students' awareness and knowledge of earthquake disaster preparedness (Winarni et al., 2021).

Furthermore, no significant increase was found on the value of the elementary school children who were included in the control group, concerning their earthquake preparedness variable between before and after the disaster preparedness intervention. The difference in the mean value of elementary school children's earthquake preparedness before and after the intervention using the Wilcoxon test in the treatment group had a p value = 0.06 (> 0.05). This shows that there is no significant difference in the preparedness score before and after the intervention. In other words, the provision of disaster preparedness training interventions with lecture and audiovisual methods without simulations does not significantly affect

elementary school children's earthquake preparedness.

The findings show that the varied methods applied in education and training will affect the results of the education and training. The combination of methods used will further increase the desired training results. Each method has advantages and disadvantages so that when they are used simultaneously, they will cover the advantages and disadvantages of each method. For example, the combination of Audio Visual and Role Play methods will give the same results to Disaster Preparedness Behavior in Elementary School Children (Sari & Suciana, 2019).

Students will not be as prepared for disasters if education and training are not given on a consistent basis and are not implemented well. Students' preparedness and knowledge for emergency planning is much increased when they are taught about earthquake disasters (Setyaningrum & Usmawati, 2020).

Children can play a significant role in building a community that is resilient to disasters and in disaster management. In their everyday lives, children are exposed to information about dangers and hazards through informal sources. Programs for disaster education must be implemented in alongside this knowledge in order to promote their involvement in disaster risk reduction in the community (Yildiz et al., 2023).

Based on the results of the previous study carried out by Wulandari, Endah & Sujito, Rizky, (2024), there was an effect of counseling on the level of student preparedness. This shows that counseling is effective in increasing a person's knowledge. Facts are found in the field that there are still many schools that have low preparedness

in facing disasters (Widjanarko & Minnafiah, 2018).

Based on the study's findings, it was determined that respondents in the treatment group and the control group were equally prepared to face an earthquake disaster during the pre-observation. However, there were significant differences in the treatment and control groups' levels of preparedness for the earthquake disaster. This demonstrates how disaster preparedness training at SDN Model Terpadu Madani Palu, which includes lecture techniques, audiovisuals, and further simulations, significantly affects how well kids are prepared to deal with an earthquake disaster.

One technique that gives participants a clear picture of the real incident that they may experience firsthand when the incident occurs is the simulation approach. Similar findings were reported by Septiana (2017), who claimed that use the simulation approach rather than the audiovisual method improved students' understanding of first aid for unconscious victims.

According to Winoto & Zahroh (2020) in their research results, they found that there was an effect of disaster preparedness socialization through the simulation method on improving skills in dealing with disasters in UNUSA disaster preparedness students. Meanwhile, Indriasari (2018) found that earthquake preparedness training using the simulation method can increase children's level of alertness. In addition, all 6th grade Giwangan Elementary School students were able and involved after the training was repeated 5 times and most of the children showed that their level of alertness was in the poorly-prepared category.

Students and schools in disaster-prone areas should be taught about catastrophes because they are an integral part of the community and play a

vital role in daily life. One of the things that determines someone's behavior, level of concern, and preparedness for a disaster is their level of knowledge. Disaster education is one of the first things the Indonesian government can undertake to make people aware of natural disasters. Disaster education is formal instruction designed to provide students the knowledge, abilities, and attitudes they need to prevent and overcome disasters and assist their community in getting back to normal when one has occurred (Ariningtyas Arum, 2019).

CONCLUSION

Based on the analysis of the research results, it can be concluded disaster preparedness training affects the preparedness of elementary school children in

facing earthquake disasters at SDN Model Terpadu Madani Palu

SUGGESTION

It is expected that the earthquake disaster preparedness training provided for elementary school children can increase their knowledge, attitudes and actions of preparedness during earthquake disasters. In addition, it is also hoped that their ability to carry out self-rescue actions during earthquake disasters will increase. Furthermore, the results of this study can be used as a reference for policy makers to make plans related to the involvement of all parties in preparing or being prepared to face earthquake disasters, including school children.

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