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THE SCHOOL WATCHING METHOD IN ENHANCING EARTHQUAKE DISASTER PREPAREDNESS OF STUDENTS AT SDN REJODADI BANTUL

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Abstract

Objective: To examine the effect of the School Watching educational method on improving earthquake disaster preparedness among students at SD Negeri Rejodadi Bantul, Yogyakarta.
Methods: This study used a pre-experimental one-group pretest-posttest design. A total of 56 students from Grades V and VI were selected through total sampling. Preparedness data were collected using a validated questionnaire based on five parameters: knowledge, emergency planning, early warning systems, resource mobilization, and information needs. Following pretest assessment, students received disaster education and participated in School Watching activities and earthquake simulation. Data were analyzed using the Wilcoxon signed-rank test, with a 95% confidence level ($\alpha = 0.05$).
Results: Before the intervention, 61.1% of students were classified as "Prepared" and none as "Very Prepared." After the intervention, 42.2% were categorized as "Very Prepared," and no students remained in the "Less Prepared" category. The Wilcoxon test showed a p-value of 0.009, indicating a statistically significant improvement in student preparedness post-intervention.

Keywords: disaster preparedness; earthquake simulation; elementary education; student readiness; school watching

INTRODUCTION

The geographical position of the Republic of Indonesia places it at the intersection of three major tectonic plates the Eurasian Plate, the Indo-Australian Plate, and the Pacific Plate. The interaction of these plates contributes to Indonesia's high vulnerability to disasters, particularly geological ones. Disasters are defined as events or a series of events that pose threats to human life and disrupt community activities, caused by natural, non-natural, or human factors, resulting in loss of life, environmental damage, property loss, and psychological impact (UU No 24 Tahun 2007)

According to the Center for Research on the Epidemiology of Disasters (CRED), in 2016, there were 342 natural disasters worldwide, leading to 8,733 deaths and affecting 569.4 million people, a significant increase from the 98.5 million affected the previous year. In 2017, Indonesia experienced 4,606 earthquakes, ranging from magnitude 3.0 to 9.5 on the Richter scale, up from 3,034 events in the previous year. From 1612 to 2014, Java Island experienced 48 major earthquakes, making it a highly seismic region due to the

subduction zone between the Indo-Australian and Eurasian Plates, with a convergence rate of 58.3 ± 0.5 to 61.8 ± 0.4 mm/year in southern West Java (Koulali et al. 2017).

A notable earthquake in 2006 resulted in 5,778 fatalities, including children under 18, 50,000 injured, 600,000 displaced, and over 127,000 houses damaged (Aulady & Fujim, 2019) Severe building damage occurred in Pleret and Piyungan Subdistricts, Bantul Regency, Yogyakarta. The earthquake activated the Opak Fault, extending from the epicenter near Parangtritis Beach to Prambanan, affecting areas such as Depok, Tritohargo, Ngambangan, and Gondowulung (Lutfinur et al., 2015).

Law No. 24 of 2007 emphasizes protection of vulnerable groups during disaster response, including infants, children, pregnant or breastfeeding women, people with disabilities, and the elderly. This protection includes rescue, evacuation, safety According to the Indonesian Child Protection Commission (2016), children and adolescents experience trauma more intensely than adults, due to their limited coping mechanisms. Over a five-year period, 930 children faced emergencies, including those abandoned, involved in conflicts, or affected by land, sea, or air disasters. Thoyibah et al (2019) reported psychological effects among child earthquake survivors in Lombok, including increased sensitivity, frequent crying or anger, panic triggered by loud noises, sleep disturbances, and social withdrawal.

Preparedness is a critical component of disaster risk reduction, involving policies, emergency planning, early warning systems, and resource mobilization. Healthcare workers, especially nurses, play an important role in all disaster phases: preparedness, mitigation, response, recovery, and rehabilitation. One effective disaster education method for schools is School Watching (Abdelalim & Ibrahim, 2014).

School Watching involves activities where students observe their school environment to identify potential hazards, evaluate safety facilities, and devise risk reduction strategies. This method helps children recognize dangerous objects or locations during disasters and teaches them self-protection (Sari, 2015).

A preliminary study at SD Negeri Rejodadi, Bantul, Yogyakarta, revealed that during the 2006 earthquake, the school sustained moderate structural damage, including cracks in classrooms and collapsed ceilings, though no casualties or loss of learning materials were reported. The school received government aid in 2007, allowing normal educational activities to resume within a year.

Based on this context, the researcher aims to design a disaster education intervention using the School Watching method, which involves school-wide hazard identification to improve student safety. Therefore, this study seeks to determine the effect of School Watching on earthquake preparedness among students at SD Negeri Rejodadi, Bantul, Yogyakarta.

METHODS

This research employed a pre-experimental design with a one-group pretest-posttest approach, where students' disaster preparedness was assessed before and after an educational intervention. Initially, students completed a pretest questionnaire to measure their preparedness levels. Following this, the intervention was carried out

using the School Watching method, after which students completed a posttest questionnaire to evaluate any changes in preparedness. Data were analyzed using the Wilcoxon signed-rank test, with a significance level of $p < 0.05$. A p-value below this threshold indicated a statistically significant difference, resulting in the rejection of the null hypothesis (H_0) and acceptance of the alternative hypothesis (H_1).

The population of this study consisted of fifth- and sixth-grade students at SD Negeri Rejodadi Bantul, Yogyakarta, with 27 students in Grade V and 29 in Grade VI, totaling 56 participants. A total sampling technique was employed, meaning all students who met the inclusion and exclusion criteria were included as respondents. The educational intervention involved several stages: delivering material on potential disaster threats relevant to the school environment, conducting a simulated earthquake drill, and implementing the School Watching activity, where students observed their surroundings to identify potential hazards related to earthquakes. During this activity, students also completed a self-assessment checklist on school safety and capacity. Additionally, material on disaster risk assessment and preparedness strategies was presented to enhance understanding.

Data collection utilized a structured questionnaire assessing five key preparedness parameters: knowledge, emergency planning, disaster early warning systems, resource mobilization, and information needs. The questionnaire was designed using a Guttman scale and consisted of 30 items. Validity testing was conducted using Pearson's correlation, where the r-count exceeded the r-table value of 0.444 with 20 respondents, confirming all items were valid. Reliability was tested using Cronbach's alpha, which resulted in a score of 0.933, exceeding the minimum threshold of 0.60, thus indicating a high level of reliability. Validity and reliability testing was conducted with sixth-grade students at SD Negeri 3 Kadipiro Bantul.

Preparedness levels were categorized into five classifications: Very Prepared (80–100%), Prepared (65–79%), Almost Prepared (55–64%), Less Prepared (40–54%), and Not Prepared (0–39%). The preparedness variable was measured on an ordinal scale. This study collected primary data directly from respondents through questionnaires, and secondary data describing the general condition of SD Negeri Rejodadi, including the number of students in Grades V and VI. The research was conducted at SD Negeri Rejodadi Bantul, Yogyakarta, and received ethical approval from the Health Research Ethics Committee under reference number 1827/KEP-UNISA/X/2023.

RESULTS

A univariate analysis was conducted to describe the characteristics of respondents and their preparedness levels for earthquake disasters at SD Negeri Rejodadi, Bantul, Yogyakarta. A bivariate analysis using the Wilcoxon signed-rank test was then performed to assess the impact of the School Watching educational method. The results are presented below.

Table 1. Frequency Distribution of Respondent Characteristics at SDN Rejodadi Bantul (2024)

No	Characteristics	Frequency (n)	Percentage (%)
		Age (years)	
1	10	8	14.2
	11	25	44.6

	12	22	39.2
	13	1	1.7
	Total	56	100
		Gender	
2	Male	32	57.1
	Female	24	42.9
	Total	56	100

Source: Primary Data (2024)

As shown in Table 1, the majority of respondents were 11 years old (25 students, 44.6%), and most were male (32 students, 57.1%).

To assess the impact of the School Watching method on earthquake disaster preparedness among students at SD Negeri Rejodadi Bantul, a pretest-posttest design was used.

Table 2. Preparedness Levels Before and After School Watching Intervention and Statistical Test Results at SD Negeri Rejodadi Bantul, Yogyakarta (2024)

Preparedness Level	Frequency (n)	Percentage (%)	Standard Deviation	p-value
	Pre-test			
Very Prepared	0	0.0		
Prepared	88	61.1	0.582	
Less Prepared	1	0.7		
Total	89	61.8*		0.000
	Post-test			
Very Prepared	61	42.2		
Prepared	83	57.6	0.496	
Less Prepared	0	0.0		
Total	144	100		

Source: Primary data, processed using SPSS (2024); confidence level 95% (α = 0.05)

Table 2 demonstrates a significant improvement in student preparedness following the simulation. Prior to the intervention, most students were in the “Prepared” category (61.1%), with no students classified as “Very Prepared”. After the intervention, 42.2% of students reached the “Very Prepared” level, and none remained “Less Prepared”.

The Wilcoxon signed-rank test produced a p-value of 0.000, indicating a statistically significant difference ($p < 0.05$) between pre- and post-intervention results. The standard deviation decreased from 0.582 to 0.496, further reflecting more consistent preparedness levels after the educational intervention.

DISCUSSION

Respondent Characteristics

Based on Table 1, the majority of respondents were 11 years old, aligning with typical developmental characteristics of elementary school-aged children, who tend to enjoy playing, physical activity, group work, and hands-on experiences. At the developmental stage of 7–12 years, children are capable of understanding and applying information, especially regarding self-protection during disasters. According to Melissa et al. (2014) children at this age can absorb and practice new knowledge effectively, making them receptive to disaster preparedness education.

Student Preparedness Before and After the School Watching Intervention

Table 2 shows a notable increase in preparedness levels following the School Watching intervention. Prior to the intervention, many students expressed uncertainty and confusion regarding actions to take during an earthquake at school, including how to protect themselves, where to seek shelter, and what hazardous objects to avoid (Hariyani, 2019). This finding is consistent with research by Indriasari (2014), which showed that students and staff at SD N Giwangan Yogyakarta demonstrated low preparedness levels even after five disaster simulations.

Similarly, Subagia (2015), identified training limitations in earthquake mitigation at schools, citing issues such as insufficient teacher preparedness, inadequate school facilities, and limited student literacy in disaster contexts. However, in this study, after the School Watching intervention, there was a measurable increase in student preparedness, with seven students reaching the “Very Prepared” category, and none remaining “Not Prepared.” This improvement was attributed to high student engagement, both in receiving the material and in participating actively in simulation exercises.

The play-and-learn concept embedded in School Watching stimulated students’ motor and cognitive development, making the learning experience both enjoyable and memorable. This aligns with findings by Wulandari (2010), emphasizing the effectiveness of multisensory learning (visual and auditory) in delivering disaster education through play-based methods.

Psychological factors such as student interest and motivation also played a crucial role. Hariyani (2019) notes that seven psychological factors including interest, talent, attention, motivation, maturity, and fatigue impact learning engagement and retention. Considering the active and playful nature of children aged 7–12, educators are encouraged to design interactive learning models that include elements of gameplay, enabling children to absorb disaster preparedness skills naturally (Mutia, M. 2021).

Although the implementation at SD N Rejodadi Bantul Yogyakarta proceeded smoothly, certain challenges were observed. These included the need for better teacher preparedness, adequate disaster education facilities, and students' reading and writing skills. According to Anton (2012), effective disaster mitigation in schools requires not only teacher training but also the integration of disaster risk reduction (DRR) into the curriculum, along with improved infrastructure to support both education and emergency response.

Impact of School Watching on Student Earthquake Preparedness

The School Watching method had a positive impact on student engagement and learning. Students were highly enthusiastic, participating in activities such as discussion, simulation, and identifying hazards around the school. The play-and-learn approach, involving movement and direct practice, made the disaster preparedness material easier to understand and retain.

Successful educational outcomes depend on understanding the developmental stage of learners. As Sumantri (in Susanto, 2013) notes, teachers who understand student characteristics can provide appropriate educational services, adjust responses to behavior, and identify developmental deviations. School Watching enabled students to

observe, interact, and practice disaster response skills, thereby developing concepts of space, time, body awareness, and cognitive growth (Mutia, 2021).

The Wilcoxon signed-rank test confirmed a statistically significant effect of the intervention, with a p-value of 0.009 (<0.05), indicating that the School Watching method significantly improved student preparedness for earthquake disasters at SD N Rejodadi Bantul Yogyakarta. Thus, H_a is accepted and H_0 rejected.

This finding is supported by Astini (2018), who reported that post-intervention preparedness improved significantly, with students moving from “Almost Prepared” to “Very Prepared” categories (p = 0.0001). Likewise, Susilo (2017) emphasized that early involvement of children in disaster simulations fosters long-term disaster awareness, while Haryuni (2018) found significant preparedness improvements post-training (p = 0.000). Meilianingsih & Sugiyanto (2022) also confirmed the effectiveness of School Watching (p = 0.000).

Considering the optimal learning window of ages 10–13, it is evident that disaster preparedness education using School Watching or similar interactive methods is both effective and age-appropriate. While School Watching was proven effective, future research could explore alternative methods or media to further enhance preparedness in school children.

In conclusion, this study confirms that School Watching significantly improves disaster preparedness, as evidenced by a higher post-test preparedness level, with students classified as “Very Prepared” increasing by 12.5%. Although not all students reached this level, the intervention substantially increased knowledge and readiness among the majority.

CONCLUSION

The results of the Wilcoxon signed-rank test demonstrated a p-value of 0.009, indicating a statistically significant effect of the School Watching educational method on student preparedness. This finding confirms that the provision of disaster education through School Watching positively influenced the earthquake preparedness levels of students at SD Negeri Rejodadi, Bantul, Yogyakarta. The intervention successfully enhanced students’ readiness to respond to earthquake emergencies, proving that interactive and context-based learning approaches are effective for disaster preparedness in elementary school settings.

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