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Nurse as Educator: Improving Children's Preparedness in Facing Landslides through the Child Preparedness Model

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ABSTRACT

Background: Disasters can significantly affect children, who are among the most vulnerable populations. Indonesia is geographically and hydrologically prone to various natural disasters. One region in East Java that includes highland areas is Kediri, which has a high risk of landslides. Landslides can cause extensive material and non-material losses within communities. In every stage of crisis management, nurses play a crucial role on the front lines. Careful planning must be conducted to manage disasters effectively, including those involving children. Nurses, as educators, can help enhance children's preparedness in facing disasters. **Methods:** This study aimed to analyze disaster management, focusing on children's preparedness for landslides through the Child Preparedness Model. This model is designed to improve children's readiness to face landslides through structured and effective steps. The study was conducted over one year, continuing from the previous research phase, which included focus group discussions and model testing. Children received preparedness education aligned with the model twice. This research employed a quasi-experimental design using a one-group pretest–posttest approach involving 120 children from Petungroto Village, Mojo District, Kediri Regency, Indonesia. A purposive sampling technique was used, and a questionnaire assessed landslide preparedness. The independent variable was the Child Preparedness Model, while the dependent variable was children's preparedness for landslides. **Results:** The model was analyzed using a paired *t*-test, which showed a *p*-value of 0.000 and t = 26.335, indicating that the Child Preparedness Model significantly influenced children's preparedness for landslides. **Conclusion:** Implementation of the Child Preparedness Model is essential to enhance preparedness, particularly among children facing landslides.

Keywords: Highland Children; Landslide Preparedness; Nurse as Educator

INTRODUCTION

Disasters are events that can cause extensive loss of property, life, and environmental stability (Panda *et al*., 2020). Because of their sudden onset and destructive nature, disasters create enormous public health challenges, including loss of life, property damage, economic disruption, and long-term health impacts (Gençbaş & Yalcin, 2023). Disasters may result from natural, non-natural, or human factors and can occur anytime, affecting anyone and causing significant destruction. Many disasters occur when people are unprepared, leading to high numbers of casualties (BNPB, 2021). When faced with a real disaster, individuals often experience shock and unpreparedness due to the magnitude of the event and its impacts (Li *et al*., 2017). These conditions emphasize the need for effective disaster management to reduce both physical and non-physical losses. Planning and simulation for such events are key factors in achieving an effective response (Chartoff *et al*., 2023).

Indonesia is one of the most disaster-prone countries in the world, both in terms of hydrologically and geologically. Disasters can range from minor to catastrophic events. At every stage of crisis management, nurses play a crucial frontline role (Putra *et al*., 2020). To improve their capacity in emergency response, nurses must possess adequate knowledge and skills, which contribute to better preparedness in disaster situations (Pandawa *et al*., 2025).

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Throughout 2022, Indonesia recorded 3,350 natural disasters. According to data from January 1 to November 30, 2022, the highest number of cases involved landslides, totaling 775 incidents. These disasters damaged thousands of homes and public facilities, including 12,367 residential buildings, 282 public facilities, 102 schools, 110 places of worship, and 27 healthcare facilities. A total of 85 people died, 131 were injured, and 30,505 were displaced. East Java is categorized as a multi-hazard region (BNPB, 2021). According to Indonesia's Disaster Risk Index, Kediri Regency, an area with many highlands, is at high risk of landslides (Chandra *et al*., 2013). The Central Bureau of Statistics of East Java notes that Mojo District in Kediri Regency experiences landslides almost every year. Petungroto Village, located in this district, often suffers material and non-material losses due to recurring landslides (Rahmawati & Kristyaningsih, 2023).

When disasters strike, they have immediate impacts on the physical, biological, and social environment, resulting in property destruction and human suffering (Lai & La Greca, 2020). Children are particularly vulnerable during such events, facing physical health risks, psychological distress, and disruptions in learning. Each year, approximately 175 million children worldwide are affected by natural disasters such as floods, cyclones, droughts, heatwaves, severe storms, and earthquakes (Kaur & Kang, 2021). In Petungroto Village, children have never received education or information on disaster preparedness, especially regarding landslides. Currently, pre-disaster preparedness is still not prioritized, and children's readiness to face landslides requires further study.

Disaster risk management represents a comprehensive approach that integrates policies, strategies, and practices aimed at minimizing disaster impacts (Thompson, 2020). According to Indonesian Law No. 24 of 2007, every region must have its own disaster management plan. Preventive measures, mitigation, and preparedness are essential elements in disaster management (Opabola, 2023). To effectively manage disaster situations, well-organized steps and coordination are critical. Proper coordination before a disaster occurs can significantly reduce fatalities, morbidity, and damage (Dehghani *et al*., 2023). Disaster risk management should therefore be implemented in a planned, integrated, and comprehensive manner (Zhong *et al*., 2014).

Actions to strengthen disaster preparedness should be enhanced through disaster risk management initiatives to minimize potential losses. The model of child preparedness can serve as a guide for stakeholders in disaster management, providing a structured framework for improving children's readiness. Child preparedness encompassing input, control processes, affectors and output plays a key role in developing resilience (Rahmawati & Kristyaningsih, 2023). The model of child preparedness focuses on children's readiness to face disasters and posits that structured interventions can enhance their preparedness through practical and effective strategies.

Disaster nursing plays a vital role in addressing the health needs of vulnerable populations during large-scale emergencies (Al Thobaity, 2024). Nurses are essential in mitigating disaster impacts on individuals and healthcare systems (Farokhzadian *et al*., 2024). As health educators, nurses contribute to improving community preparedness, particularly among children (Nopriyanti, 2023). Community nurses also play an essential role in promoting public health through local-level interventions (Akbar *et al*., 2020). Emergency nurses are responsible for providing preventive care, health education, and primary healthcare services (Bazyar *et al*., 2020). This study therefore aims to examine the role of nurses as educators in improving children's preparedness for landslides.

Research Gap

Although numerous studies have examined disaster preparedness in children, most existing research has focused on general disaster education programs or broad disaster-risk-reduction strategies. These studies often do not address hazards with specific characteristics, such as landslides, which require distinct knowledge, skills, and behavioral responses. In Indonesia, one of the world's most disaster-prone countries, research on child-centered preparedness remains limited, particularly in high-risk regions such as Kediri, East Java. Furthermore, while children are recognized as a vulnerable group in disaster settings, few studies have integrated nurses' roles as educators into structured preparedness models tailored to children. Existing literature also lacks empirical evaluation of models designed specifically to strengthen children's readiness for landslides

through systematic and replicable steps. Consequently, there is a need for research that validates a targeted preparedness model emphasizing the role of nurses in educating children within landslide-prone communities. This study addresses these gaps by testing the Child Preparedness Model and examining its effectiveness in improving children's preparedness for landslides.

Research Question

How effective is the Child Preparedness Model as an educational approach delivered by nurses in enhancing landslide preparedness among children living in high-risk areas?

METHODOLOGY

Research Design

This study is a continuation of previous research that developed the Child Preparedness Model. In the second year, the research was conducted over a one-year period in two main stages: the first stage involved Focus Group Discussions (FGDs) and the second stage tested the implementation of the Child Preparedness Model. This research employed a quasi-experimental design using a one-group pretest–posttest approach and adopted a quantitative method (Nwabuko, 2024).

This study's exploratory design aimed to develop a deeper understanding of child preparedness and disaster management. The research procedure included two phases: (1) conducting FGDs and (2) implementing and testing the model of child preparedness in enhancing children's readiness for landslides. The study design employed a one-group pretest–posttest approach to assess changes in knowledge and attitudes related to landslide preparedness.

Sample Size

A total of 120 children from Petungroto Village, Mojo District, Kediri Regency, Indonesia, participated in the study. The sampling technique used was purposive sampling, and a questionnaire was applied to measure disaster preparedness. Purposive sampling is commonly used in research because it allows for the intentional selection of participants who meet specific criteria, minimizing bias and enhancing the validity and credibility of the findings (Nyimbili & Nyimbili, 2024).

Pilot Study

The preparedness questionnaire was tested for validity using Pearson's Product Moment correlation, while reliability testing employed Cronbach's Alpha, yielding a coefficient of 0.984, which indicates satisfactory reliability. The reliability coefficient of 0.7 indicates satisfactory internal consistency, meaning the items in the questionnaire consistently measure the same concept. The validity test was conducted using Pearson's Product Moment correlation, and the results showed that all 25 questionnaire items met the established criteria. Each item demonstrated an r-count value greater than the r-table value and a p-value less than 0.05, indicating that all items are statistically valid and appropriately measure the intended construct. A Pearson validity test deems an instrument valid when its significance value is less than 0.05 (Hidayati *et al*., 2023).

Validity/Reliability Explanation

The validity and reliability of the preparedness questionnaire were evaluated prior to its use in the study. Instrument validity was assessed using Pearson's Product Moment correlation, which examines the relationship between each questionnaire item and the total score. An item is considered valid when its r-count value exceeds the *r*-table value and its p-value is less than 0.05, indicating a significant contribution to measuring the intended construct. All 25 items met these criteria, demonstrating strong content validity. The reliability of the instrument was measured using Cronbach's Alpha, a statistical coefficient that evaluates the internal consistency of the items. A Cronbach's Alpha value of 0.70 or higher is generally regarded as acceptable, reflecting consistent measurement across items. In this study, the questionnaire achieved a Cronbach's Alpha of 0.984, indicating excellent reliability and confirming that the instrument consistently and accurately measures children's preparedness for landslides.

Table 1: Validity Summary

Item No.	Corrected Item-Total Correlation	*r*-table	Validity Status
1	0.412	0.312	Valid
2	0.523	0.312	Valid
3	0.352	0.312	Valid
4	0.489	0.312	Valid
5	0.351	0.312	Valid
6	0.411	0.312	Valid
7	0.561	0.312	Valid
8	0.434	0.312	Valid
9	0.376	0.312	Valid
10	0.368	0.312	Valid
11	0.502	0.312	Valid
12	0.471	0.312	Valid
13	0.389	0.312	Valid
14	0.518	0.312	Valid
15	0.463	0.312	Valid
16	0.534	0.312	Valid
17	0.448	0.312	Valid
18	0.367	0.312	Valid
19	0.458	0.312	Valid
20	0.551	0.312	Valid
21	0.482	0.312	Valid
22	0.399	0.312	Valid
23	0.390	0.312	Valid
24	0.563	0.312	Valid
25	0.426	0.312	Valid

Based on Table 1, it can be seen that 25 questions have been declared valid because the calculated *r*-value exceeds the table *r*-value and the *p*-value is less than 0.05.

Inclusion and Exclusion Criteria

The inclusion criteria were (1) children residing in Petungroto Village and (2) children aged 6–12 years. The exclusion criterion was lack of willingness to participate as respondents.

Tools for Data Collection

The independent variable of this study was the model of child preparedness, while the dependent variable was children's landslide preparedness. After data collection, data processing and analysis were carried out accordingly.

The intervention included educational sessions lasting approximately eight hours, accompanied by distribution of modules and leaflets. A pretest was conducted on the first day, education sessions on the second day, and a posttest on the third day. In addition to implementing the Child Preparedness Model, this study assessed children's preparedness levels before and after the intervention.

Study Setting

The study took place in Petungroto Village, Mojo District, Kediri Regency, Indonesia. The FGDs were conducted to elaborate on the model of child preparedness and improve disaster readiness. Focus groups serve as a vital qualitative research method that fosters interactive discussions, enabling in-depth exploration of diverse perspectives (Chai *et al*., 2024).

Data Analysis

Data analysis for model evaluation employed the paired *t*-test to determine the significance of changes in preparedness levels before and after the model's implementation. The model was analyzed using a paired *t*-test

with SPSS 28.0, which showed a *p*-value of 0.000, *t*=26.335, and *d*=2.40, indicating that the Child Preparedness Model significantly influenced children's preparedness for landslides.

Ethical Consideration

The researchers obtained ethical clearance from the Research Ethics Committee of the Institut Ilmu Kesehatan Bhakti Wiyata Kediri, Indonesia, with reference number 03/FKes/TK/VI/2024 on 13th June 2024.

All procedures conducted in this study adhered to ethical standards for research involving human participants, including informed consent, confidentiality and voluntary participation.

RESULTS

Table 2: Respondents' Characteristics (n=120)

Characteristics	Category	Sum	Percentage (%)
Age	6-8 years	54	45%
	8-12 years	66	55%
Gender	Male	24	20%
	Female	96	80%
Education History	Never	108	87.5%
	Ever	15	12.5%

Table 2 presents the demographic characteristics of the respondents. The data show that 55% of respondents were aged 8–12 years, while 45% were aged 6–8 years. A majority of respondents were female (80%), and 87.5% had previously received some form of education about natural disasters, although primarily through indirect sources such as posters or flyers.

Table 3: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Age	120	1.00	2.00	1.5500	0.49958
Gender	120	1.00	2.00	1.8000	0.40168
Education History	120	1.00	2.00	1.1000	0.30126
Valid N (listwise)	120				

Based on Table 3, the results show that the mean age is 1.5500, the mean gender is 1.8000, and the mean education history is 1.1000. Meanwhile, the standard deviation values indicate that age has a standard deviation of 0.49958, gender has 0.40168, and education history has 0.30126.

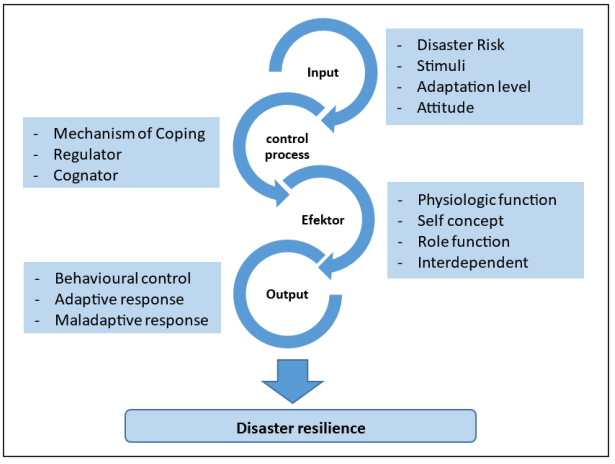

Figure 1: Model for Children's Preparedness

The Child Preparedness Model illustrates a disaster risk management framework centered on children's preparedness. The model encompasses input, control processes, affectors, and outputs that collectively contribute to disaster resilience. It is an adaptation of Roy's Adaptation Model, emphasizing how children can

develop adaptive responses when facing natural disasters such as landslides.

Table 4: Children's Preparedness Before and After Implementation of the Model (n=120)

Indicators	Preparedness				Difference Between Pretest and Post Test
	Pretest	Percentage (%)	Post test	Percentage (%)	
Ready	0	0%	80	66.6%	80
Less ready	24	20%	20	33.4%	4
Not ready	96	80%	0	0%	96

As shown in Table 4, children's preparedness levels improved significantly following the implementation of the Child Preparedness Model. Prior to the intervention, 80% of respondents were categorized as "not ready," while only 20% were "less ready." After the intervention, 66.6% of respondents were classified as "ready," 33.4% as "less ready," and none were "not ready." These results indicate a marked improvement in children's readiness to respond to landslide disasters following the educational intervention. The difference between the pretest and posttest is 80 ready, 4 less ready, and 96 not ready.

Table 5: Paired T-Test Results (n=120)

Paired Samples Test										
		Paired Differences					*T*	*df*	Significance level (2 - tailed)	Effect Size (Cohen's d)
		Mean	Standard Deviation	Standard Error Mean	95% Confidence Interval of the Difference					
					Lower	*Upper*				
Pair 1	Pretest Posttest	-62.70000	6.16114	0.56243	-63.81367	-61.58633	26.335	119	0.000	2.40

T=statistical t-value from the t-test; 2-tailed= The test checks for differences in both directions (whether the mean is higher or lower); Significance level=(p-value)- p-value is statistically highly significant; Effect Size (Cohen's d) is large

According to the results of the paired *t*-test, the application of the Child Preparedness Model significantly influenced children's preparedness for landslides, $t(119)=26.335$, $p<0.001$, d=2.40. This indicates a statistically significant difference between pretest and posttest scores. After the intervention, children demonstrated improved understanding and behavior related to disaster response. They were able to identify evacuation routes, recognize safe areas during landslides, prepare emergency kits, and memorize important emergency contact numbers (Table 5).

DISCUSSION

The findings of this study demonstrated that most children were initially unprepared to face disasters before the implementation of the Child Preparedness Model. After the intervention, a significant improvement was observed, with the majority of participants categorized as ready to respond to landslides. Globally, healthcare systems continue to exhibit inadequate levels of preparedness for pediatric disaster events, with the issue being particularly pronounced in resource-constrained environments (Onyejesi *et al*., 2025). Educational interventions play a crucial role in improving children's readiness to face disasters. By receiving appropriate disaster education, children can develop knowledge, attitudes, and behaviors that support disaster preparedness. This finding aligns with Nofal *et al*. (2018), who emphasized that healthcare providers, particularly nurses, play an essential role in minimizing the impact of disasters on victims and healthcare systems (Nofal *et al*., 2018).

Emergency nurses are key actors in disaster preparedness and response. To ensure effective responses during real emergencies, they participate in disaster drills and simulation exercises (Olorunfemi & Adesunloye, 2024). This aligns with national recommendations emphasizing that nurses must be equipped to advance community health and disaster readiness (Wakefield *et al*., 2021) and also aligns with the nursing role as an educator (Siregar *et al*., 2022). Nurses also enhance community knowledge through education and counseling activities (Bastina, 2022). Health education can be delivered through counseling or training sessions (Ulya *et al.*, 2023). While the lecture method has been proven effective for increasing knowledge, it can be complemented with interactive methods such as educational games (Komala & Febriani, 2023). In this study, nurses and

researchers provided direct counseling to respondents, followed by the distribution of informational leaflets to reinforce learning. Factors such as experience, education, and training significantly influence nurses' knowledge and preparedness for disaster response (Olorunfemi & Adesunloye, 2024). Previous studies have shown that the frequency and quality of training are directly associated with higher disaster preparedness among healthcare workers (Almukhlifi *et al*., 2021). Nurses with greater experience in disaster management demonstrate higher confidence and competence in handling emergency situations (Labrague *et al*., 2018).

The child preparedness model incorporates several components—stimuli, input, control processes, affectors, and outputs—that collectively determine disaster preparedness levels among children. Inputs such as age and gender can affect children's readiness, as older children tend to have greater cognitive maturity and access to information. This finding supports previous research indicating that children's knowledge of disaster preparedness remains limited. Control processes include coping mechanisms and learning activities that shape children's adaptive responses during disasters. Affectors involve physiological factors, self-concept elements (such as anxiety and fear), and social interactions. Social interaction plays a particularly important role in determining behavioral responses during emergencies; for example, knowing evacuation routes and appropriate actions during landslides (Rahmawati & Kristyaningsih, 2023). Enhancing children's capacity through structured education can therefore improve their adaptive responses.

Preparedness involves proactive measures and organizational effectiveness that can reduce casualties and property loss (BNPB, 2021). Since young children are often unable to protect themselves effectively, they are considered a vulnerable group with a higher risk of disaster-related impacts (Humsona *et al*., 2019). Therefore, strengthening disaster preparedness among children is essential for building resilience. Developing personal capacity and strengthening individual character are critical to improving disaster preparedness (Putra *et al*., 2020). Community-based disaster risk management is another promising approach to enhance resilience (Zhao *et al*., 2025). This study reaffirms that children play a central role in community preparedness and that targeted educational interventions can significantly improve their readiness to face disasters such as landslides.

Limitations

This study had several limitations. First, its geographic scope was limited to landslide-prone regions in Kediri Regency, which may restrict the generalizability of findings to other disaster contexts. Second, the use of self-reported questionnaires and observations may have introduced response biases. Third, the study's short evaluation timeframe may not capture long-term knowledge retention. Additionally, variations in the training and experience of nurses involved in model implementation could have influenced the outcomes. Future research should expand geographic coverage, employ longitudinal designs, and standardize nurse training to ensure consistent model application.

CONCLUSION

This study concludes that the Child Preparedness Model, comprising input factors, coping mechanisms, affectors, and adaptive behavioral outputs, significantly improves children's preparedness for landslides. The model led to substantial gains in children's ability to identify hazards, recognize evacuation routes, prepare emergency items, and demonstrate appropriate responses during a landslide scenario.

Beyond statistical significance, the model provides practical value for disaster-prone rural communities. Its structured educational components can be adopted by schools, community health nurses, and village disaster response teams to strengthen local resilience. Nurses, in particular, play a vital role as educators in delivering disaster readiness programs and supporting vulnerable populations such as children. The model holds strong potential for integration into school-based disaster curricula and community preparedness initiatives, contributing to long-term disaster risk reduction in high-risk regions.

Future research should include longitudinal studies to assess the sustainability and long-term impact of the Child Preparedness Model on children's knowledge, attitudes, and behaviors. Expanding the research into various geographical regions and disaster types, such as floods, earthquakes, or volcanic eruptions, would enhance the model's generalizability and applicability. Moreover, future interventions should involve parents,

teachers, and community leaders to strengthen support systems surrounding children. The integration of interactive digital media, simulation-based learning, and school curricula could also enhance engagement and retention of disaster preparedness skills. The Child Preparedness Model holds potential to be further developed as a guideline for national disaster preparedness programs, with nurses serving as key educators and facilitators. Testing the model across different cultural and socio-economic settings may also help refine its structure for broader implementation.

Conflict of Interest

The authors declare no conflict of interest regarding the publication of this study.

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