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# THE EFFECT OF LANDSLIDE DISASTER MITIGATION KNOWLEDGE ON STUDENT PREPAREDNESS IN NORTH BALIKPAPAN DISTRICT

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**ABSTRACT**

*Landslides pose a serious threat, causing significant property damage and loss of life. This study aimed to determine the extent to which knowledge of landslide mitigation can enhance students' preparedness. A survey of approximately 700 middle school students in North Balikpapan district was conducted. The results showed a positive correlation between knowledge of landslide mitigation and students' preparedness. The higher the students' knowledge, the better prepared they were to face landslides. This study concludes that increasing students' knowledge about landslide mitigation can effectively improve their preparedness.*

*Keywords: mitigation knowledge, landslide disaster, preparedness, disaster education*

## 1. INTRODUCTION

Indonesia is one of the countries that has a high level of natural disaster risk, including landslides. Landslides often occur in areas that have steep slopes, high rainfall, and unstable soil conditions. According to the National Disaster Management Agency (BNPB), every year there are hundreds of landslide cases in Indonesia that result in material losses and casualties (BNPB, 2022). Therefore, landslide disaster mitigation is very important, especially for people living in landslide-prone areas.

Knowledge about landslide disaster mitigation can be the main key in improving community preparedness, including among school students. Students who have a good knowledge of disaster mitigation methods will be better prepared to face and reduce the risks posed by landslides. This study aims to examine the influence of landslide disaster mitigation knowledge on student preparedness in North Balikpapan District, an area that is known to have a fairly high potential for landslide risk.

Disaster preparedness is one of the important aspects in efforts to reduce disaster risk. According to Law No. 24 of 2007 concerning Disaster Management,

preparedness is a series of activities carried out to anticipate disasters through organizing and through appropriate and effective steps (Law No. 24, 2007). Thus, increasing landslide disaster mitigation knowledge among students will not only improve their preparedness, but will also contribute to the safety and resilience of the community as a whole.

## 2. LITERATURE REVIEW

A. Disaster

A disaster is an event or series of events that cause damage, loss, and suffering to humans. According to Law No. 24 of 2007, disasters can be divided into natural disasters, non-natural disasters, and social disasters. Natural disasters include phenomena such as earthquakes, floods, volcanic eruptions, and landslides. Disaster risk management is important to reduce the negative impact caused by the disaster.

B. Mitigation

Mitigation is an effort to reduce the risk and impact of disasters through various actions aimed at reducing vulnerability and increasing community capacity. According to Wisner et al. (2004), mitigation can be divided into structural and non-structural mitigation. Structural mitigation includes physical construction such as retaining walls or drainage systems, while non-structural mitigation includes education, training, and increasing public awareness.

C. Landslide

A landslide is the movement of a mass of soil or rock down a slope due to the influence of gravity. According to Rahardjo et al. (2010), factors that affect the occurrence of landslides include geological conditions, rainfall, slope slopes, and human activities such as deforestation. The impact of landslides can be in the form of infrastructure damage, loss of productive land, and threats to human safety. Landslide mitigation efforts include slope stabilization, drainage channel construction, and revegetation.

D. Preparedness in Landslide Disaster Mitigation

Preparedness is a series of actions taken to anticipate and respond to disasters effectively. According to LIPI (2015), preparedness includes public awareness and knowledge about disaster risk, as well as the capacity to carry out mitigation actions. In the context of landslide disaster mitigation, preparedness includes knowledge of the early signs of landslides, evacuation actions, and skills in conducting first aid. This study emphasizes the importance of increasing landslide disaster mitigation knowledge among students to improve their preparedness.

## 3. RESEARCH METHODOLOGY

This study uses a quantitative survey method to examine the influence of landslide disaster mitigation knowledge on student preparedness. This method was chosen because it allows researchers to collect data from a large sample and analyze the relationships between the variables studied.

The population in this study is all junior high school (SMP) students in North Balikpapan District, Balikpapan City. The sample is taken at random simply to get a good representation of the population. The number of samples taken in this study was 702 students.

The instrument used in this study is a questionnaire consisting of two main parts:

1. Students' knowledge of landslide disaster mitigation, which includes questions regarding the definition and causes of landslides.

2. Student preparedness for landslide disasters, which includes questions about knowledge in dealing with landslide disasters.

Data was collected by distributing questionnaires to junior high school students in North Balikpapan District during October-November 2024. The questionnaire was distributed directly to the schools that had been selected as research samples. Students are given 10 minutes to fill out the questionnaire.

The stages of the research can be seen in the research flow chart in Figure 3.1 below.

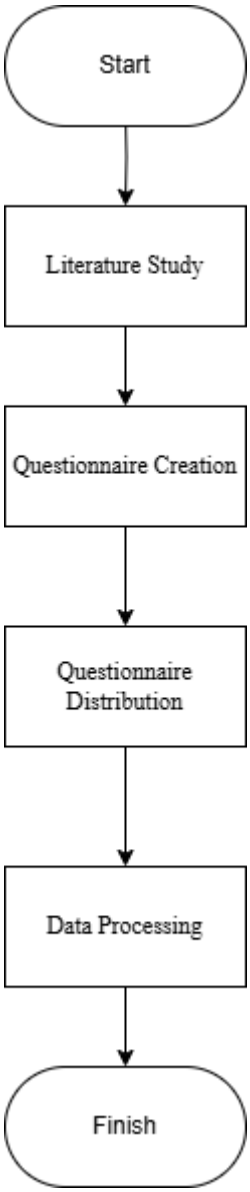


Figure 3.1 Research flowchart

## 4. ANALYSIS AND DISCUSSION

### A. Characteristics Based on Respondent's Age

Based on the results of data analysis using descriptive statistics, the age of the respondents was obtained, which can be seen in the following table.

**Table 4.1 Distribution of** Respondent Age Frequencies in Several Junior High Schools in North Balikpapan District 2024

| No | Age | Frequency | Presented (%) |
|---|---|---|---|
| 1 | 12 Years | 80 | 11 |

| | | | |
|---|---|---|---|
| 2 | 13 Years | 348 | 50 |
| 3 | 14 Years | 234 | 33 |
| 4 | 15 Years | 36 | 5 |
| 5 | 16 Years | 4 | 1 |
| | Total | 702 | 100 |

Source : Analysis Results (2024)

Based on table 4.1, the most dominant adolescent age is 13 years old as many as 348 people with a percentage (50%) and the least is 16 years old as many as 4 people with a percentage (1%).

The age range of 12-16 years is early to mid-adolescence, where individuals are experiencing significant physical, emotional, and cognitive development. According to Catibog Landicho (2024), adolescents at this age begin to develop abstract and logical thinking skills, and begin to form self-identity and independence. This study aims to assess adolescents' knowledge and preparedness for landslide disaster mitigation, so it is important to understand the characteristics of the age of adolescents who are the research samples.

Adolescents in this age range also begin to show improvements in analytical and decision-making skills. This is in line with the opinion of Dhanawade and Patil (2024) who stated that adolescents have the ability to think critically and reflectively on the situation they are facing. Knowledge about landslide disaster mitigation taught at this age is expected to improve adolescents' preparedness and response to disasters, so that they can act appropriately and effectively when facing emergency situations.

The environment and daily activities of adolescents are very influential in shaping their knowledge and preparedness for disasters. As stated by Khaspuria et al. (2024), educational activities involving adolescents can increase their awareness and preparedness for disasters. Therefore, it is important to include disaster mitigation education programs in the school curriculum so that adolescents have adequate knowledge and skills to deal with landslide disasters.

**B. Characteristics Based on Respondent's Gender**

Based on the results of data analysis, the frequency of respondents' genders is obtained in Table 4.2 below.

**Table 4.2** Distribution of Respondents' Gender Frequency in Several Junior High Schools in North Balikpapan District 2024

| No | Gender | Frequency | Presented (%) |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 1 | Male | 363 | 52 |
| 2 | Woman | 339 | 48 |
| | Total | 702 | 100 |

Source : Analysis Results (2024)

Based on table 4.2, it shows that the gender of the majority of respondents is 363 men with a percentage (52%) and 339 women with a percentage (48%).

Sex is a classification in a species based on biological characteristics that determine roles in sexual reproduction, namely male and female. Gender can affect a person's understanding and response to disasters, because there are differences in the way of thinking and acting between men and women. According to research conducted by Wardani et al. (2019), men tend to use a logical and analytical approach in dealing with emergency situations, while women more often use emotional and intuitive approaches.

In the context of disaster mitigation, these differences can affect the level of preparedness and response of each gender. Research by Kurniawan (2018) shows that men tend to be more physically and mentally prepared in facing disasters due to their higher physical strength and strategic thinking skills. However, women have advantages in terms of thoroughness and care, which can increase effectiveness in the implementation of disaster mitigation plans.

This research is in line with research conducted by Utami and Rahayu (2020), which showed that there was no significant relationship between gender and disaster mitigation ability. However, gender differences can affect perceptions and decisions in dealing with disasters. Therefore, understanding these differences is important to design effective disaster mitigation education programs for both genders.

## C. Characteristics Based on Respondents' Landslide Mitigation Knowledge Questionnaire

**Table 4.3 Distribution of** Frequency of Questionnaire on the Effect of Landslide Disaster Mitigation Knowledge on Respondents of Several Junior High Schools in North Balikpapan District

| No | Category | Frequency | Percentage (%) |
|---|---|---|---|
| 1 | Good | 469 | 67 |
| 2 | Enough | 160 | 23 |
| 3 | Less | 73 | 10 |

| | | | |
|---|---|---|---|
| | Total | 702 | 100 |

Source : Analysis Results (2024)

Based on table 4.3, showing the level of knowledge of respondents on landslide disaster mitigation, an overview of the level of knowledge with good scores (Score 80-100) was obtained by 469 people with a percentage of 67%, sufficient scores (Score 60-79) by 161 people with a percentage of 23%, and poor scores (Score 0-59) by 73 people with a percentage of 10%.

This study proves that most respondents in North Balikpapan District are already aware of landslide mitigation efforts and landslide danger signs. This may be influenced by the geographical condition of Balikpapan which has an area with labile soil and a fairly steep slope, which is often a landslide-prone location. Armed with previous knowledge and experience, respondents were able to apply their knowledge in landslide mitigation efforts. Respondents knew about the prevention of landslide disasters such as not cutting down forests and not clearing agricultural land in steep hilly areas.

In Law No. 24/2007 on Disaster Management, mitigation is defined as a series of efforts to reduce disaster risk both through physical development and awareness and improvement of the ability to deal with disaster threats. However, in its implementation, public knowledge still needs to be improved. According to Purwanto (2018), people in disaster-prone areas often do not have adequate knowledge about disasters and do not have the necessary adaptive abilities. Therefore, increasing public awareness and empowerment is essential to reduce disaster risks and impacts.

Along with this problem, the exploration of local wisdom is urgently needed to provide understanding and guidance for disaster mitigation, including knowledge of the characteristics of disasters and the prohibition of activities that damage the environment or ecosystem balance. A study by Lestari et al. (2020) shows that with proper socialization and coaching, public knowledge about disaster mitigation can be significantly improved.

## D. Characteristics Based on Questionnaire on Landslide Mitigation Awareness of Respondents

**Table 4.4 Distribution** of Frequency of Questionnaire on the Effect of Landslide Disaster Mitigation Knowledge on Respondents of Several Junior High Schools in North Balikpapan District

| No | Category | Frequency | Percentage (%) |
|---|---|---|---|
| 1 | Good | 29 | 4 |

| | | | |
|---|---|---|---|
| 2 | Enough | 501 | 71 |
| 3 | Less | 172 | 25 |
| | Total | 702 | 100 |

Source: Analysis Results (2024)

Based on table 4.4, showing the level of knowledge of respondents on landslide disaster mitigation, an overview of the level of knowledge with good scores (Score 31-40) was obtained by 29 people with a percentage of 4%, sufficient scores (Score 21-30) as many as 501 people with a percentage of 71%, and poor scores (Score 0-20) as many as 172 people with a percentage of 25%.

This study shows that the preparedness of students in North Balikpapan District for landslide disaster mitigation is at a sufficient level. This shows that even though students have good knowledge about disaster mitigation, their preparedness in dealing with such disasters still needs to be improved. Sufficient preparedness shows that students have the basic knowledge and skills to deal with disasters, but are not fully prepared to respond optimally.

According to Setiawan (2018), disaster preparedness involves aspects of knowledge, attitudes, and actions that must be prepared to reduce disaster risks and impacts. This study shows that students in North Balikpapan still need to improve in terms of training and disaster simulation to improve their preparedness. Disaster simulation is one of the effective methods to train preparedness because it can help students understand the steps that must be taken when a disaster occurs (Rachmawati, 2020).

In the context of landslide disaster mitigation, it is important for students to understand the early signs of landslides, appropriate evacuation actions, and skills in providing first aid. This research is in line with research conducted by Yusuf et al. (2017) which stated that disaster mitigation training and education can significantly increase student preparedness. Therefore, it is recommended that disaster mitigation education programs continue to be improved and socialized in a sustainable manner in schools in North Balikpapan.

## 5.CONCLUSION

The conclusions from the above research are:

1) The majority of respondents were 13-year-old students as many as 348 people (50%). The majority of respondents were male as many as 363 people (52%).
2) The level of knowledge of adolescents related to landslide disaster mitigation in North Balikpapan sub-district is mostly good knowledge with a total of 469 respondents (67%), but the majority of adolescents in North Balikpapan sub-district have sufficient preparedness with the number of respondents as many as

501 people (71%) even though they have good knowledge.

## BIBLIOGRAPHY

Catibog Landicho, K. (2024). *Emergency Preparedness and Contingency Planning: Lessons from 2024 for ASEAN Disaster Management*. Singapore: RSIS.

Dhanawade, A., & Patil, H. (2024). "Disaster Preparedness and Response Strategies." *International Journal of Research Publication and Reviews*, 5(11), 2869-2870.

Hakim, R. (2017). "Public Knowledge about Soil Disaster Mitigation Landslide." *Journal of Disaster Management*, 6(1), 34-45.

Khaspuria, G., Ranjan, A., Sahil, P., Soni, P., & Dadhich, K. (2024). "Natural Disaster Mitigation Strategies: A Comprehensive Review." *Journal of Scientific Research and Reports*, 30(8).

Kurniawan, T. (2018). *Disaster Mitigation in Indonesia: Challenges and Solutions*. Jakarta: University of Indonesia Press.

Lestari, D., et al. (2020). "Community Empowerment in Disaster Mitigation." *Journal of Social Sciences*, 12(2), 123-135.

Nindi LN, dkk. (2019). Gender Differences in Disaster Preparedness and Response. Jakarta: Jakarta State University Press.

Purwanto, A. (2018). Disaster Mitigation in Indonesia: Challenges and Solutions. Jakarta: University of Indonesia Press.

Rachmawati, N. (2020). Disaster Simulation as a Training Method Preparedness. Surabaya: Airlangga University Press.

Salasa, A., et al. (2017). "The Role of Education in Improving Preparedness Disaster in Adolescents." Journal of Disaster Education. Surabaya: Publisher State University of Surabaya.

Setiawan, A. (2018). "Disaster Preparedness Among Students." *Journal Education and Disaster*, 5(3), 245-256.

Utami, D., & Rahayu, S. (2020). "The Influence of Gender in Disaster Mitigation." Journal of Disaster Studies, 10(4), 67-78.

Wardani, F., et al. (2019). *Differences in Gender Response to Natural Disasters*. Bandung: ITB Press Publisher.

Yusuf, M., et al. (2017). "Increasing Student Preparedness Through Education Disaster Mitigation." *Journal of Disaster Mitigation*, 9(2), 78-89.

Dwi, C., Siti, F. (2022). "Overview of the Level of Knowledge About Landslide Disaster Mitigation in Adolescents in Jeruk Selo Boyolali Village". Journal of Public Health, 1(4), 455-463.