



Correlations Between Knowledge About Landslides and Preparedness for Disasters: Cross-Sectional Study

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Abstract

Landslide events in Indonesia are often caused by high rainfall and unstable mountain slopes. With these conditions, the risk of landslides is higher if the rainy season occurs. Landslide disasters cause loss of life and property and disrupt the order of life. Reducing the risk of disaster impacts can be reduced by increasing preparedness in dealing with disasters. This study aimed to determine the relationship between knowledge about landslides and community preparedness in Hargowilis village. This type of research is a quantitative study with a cross-sectional research design. The sampling technique used in this study was purposive sampling, with a sample size of 102 heads of households in Hargowilis Kokap Kulonprogo village. The measuring instrument used is a landslide disaster knowledge questionnaire and a disaster preparedness questionnaire—statistical data analysis using the Chi-Square test. Based on the characteristics of the respondents, most of them were aged 50-59 years (25.6%), the majority were male (82.4%), most of them had high school education (42.2%), and most of them were farmers (51%). Most knowledge about landslides is in the moderate category (46.1), and the Preparedness Level is mostly in the high category (64.7). Landslide disaster with disaster preparedness in the village of Hargowilis Kokap Kulonprogo There is a significant relationship between knowledge of landslide disasters and disaster preparedness in the village of Hargowilis Kokap Kulonprogo. This research can provide information about the relationship between knowledge and preparedness for landslide disasters so that people can understand the importance of having sufficient knowledge and good preparedness in dealing with this disaster.

Keywords *Knowledge, Preparedness, Disaster, Landslide*

INTRODUCTION

Indonesia consists of two seasons, namely, the dry season and the rainy season. The dry season lasts from April to October, with Indonesia's rainy season in early October. Natural disasters that can be alerted at the start of the rainy season are frequent landslides. The amount of rainfall that causes landslides is high, 1,000-4,000 per year; rainfall of that magnitude causes flooding. In addition, Indonesia has mountains with many unstable slopes prone to landslides. The abundance of rainfall is due to Indonesia's location on the equator (BNPB, 2019; Nugroho, 2016).

The Natural Disaster Mitigation Agency (BNPB) recorded 1,141 landslides in 2018-2019, with 238 people killed and missing, 236 people injured, 44,119 people miserable and displaced, 1,354 houses heavily damaged, 722 houses moderately damaged, 2,297 houses damaged light, 56 houses submerged in water, ten puskesmas damaged, 87 places of worship damaged and 51 educational institutions damaged (BNPB, 2019). This disaster's consequences were very detrimental from an environmental and socio-economic perspective (Susanti, 2017).

Landslides in the Special Region of Yogyakarta occurred in all regencies/cities, which experienced the most landslides in Kulon Progo Regency. There are 18 villages from 6 sub-districts in the Regency Kulon Progo, which has experienced landslides. Villages in Kulon District Progo which has experienced landslides Ngargosari, Pagerharjo, Gerbosari, Banjaroyo, Sidoharjo,

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Banjarsari, Banjararum, Purwoharjo, Giripurwo, Hargetirto, Hargowilis, Hargomulyo, Hargorejo, Pengasih, Kedungsari, Karangasari, Purwosari, and Kalirejo (BPBD Kulon Progo, 2016). According to Mustakim (Permana & Wiguna, 2012), this is caused by mining and the lack of catchment areas which cause many landslides in Kulon Progo. Mining can be legal or illegal. The area that became the target of gold mining in Yogya was the Kokap area. This causes many landslides in the area (Permana & Wiguna, 2012). Landslides can cause serious impacts such as damage and loss. The losses that are felt can affect the local community in the long term. The damage can be in the form of death, damage to property, and disruption of natural ecosystems. Therefore, cleaning actions are needed, especially in production areas, economic roads, residential areas, and infrastructure (Fitrianingrum, 2018). According to the BPBD, several efforts have been made to prevent the construction of settlements under landslide slopes, reduce the level of slope gradient by cultivating terracing land in slope areas, maintain good drainage on the slopes, prevent water from flowing from the slopes, build buffer structures so that there is no movement of the soil causing landslides, planting trees with deep roots and not too tight spaces between them - short plants. Among them can maintain drainage and plant landslide trees to relocate areas; although it requires large resources, it is a necessary effort that the government must carry out because the threat of disaster can take lives and significant losses (BPBD, 2020). Activities to minimize the occurrence of landslides are part of preparedness.

Preparedness is carried out in the pre-disaster phase, which aims to build and develop the capacity to effectively manage all types of emergencies to overcome the transition period of sustainable recovery (Muis & Anwar, 2018). Hargowilis Village has the potential for landslides with a high hazard level and medium vulnerability class (BPBD Kulon Progo 2016). This research can provide information about the relationship between knowledge and preparedness for landslide disasters so that people can understand the importance of having sufficient knowledge and good preparedness in dealing with this disaster.

LITERATURE REVIEW

Previous research by Adiwijaya (2017) used quantitative methods with an explanatory survey approach, which aims to test theories and explain the influence of two or more variables. Sampling used a simple random sampling technique, as many as 99 people out of 7,253 people living in Lawanggintung Village. Based on simple regression (T-test) testing, there is a positive and significant influence on disaster knowledge and community attitudes toward landslide preparedness. Meanwhile, multiple regression testing (F test) shows a simultaneous and significant positive influence on disaster knowledge and community attitudes towards preparedness for landslides in Lawanggintung Village, South Bogor District. The regression equation $Y = 0.082 + 0.153X_1 + 0.780X_2$ shows that people's attitudes are higher when compared to disaster knowledge. Another study is to know the relationship between the level of disaster knowledge and the attitude of preparedness in dealing with landslides in Lonjoboko Village. Samples were taken using the Simple Random Sampling Technique, with as many as 97 people from 2,886 residents. Data collection techniques used are Documentation, Questionnaire, and Observation. Data analysis was carried out using the descriptive quantitative analysis method, simple linear regression analysis to determine whether a variable had an influence on other variables, and carrying out a normality test using the Kolmogorov-Smirnov method and graphical methods. The community's behaviour towards preparedness in the face of landslides in Lonjoboko Village is in the poor category because the people only think about survival, so they do not take the time to prepare their vigilance for disasters. The test results used simple linear regression analysis, so it was found that there was a positive influence of disaster knowledge on residents' preparedness in dealing with landslides in Lonjoboko Village. This means that the higher the disaster knowledge, the higher the residents'

preparedness in dealing with landslides (Nur Alam, 2019). Another study aimed to determine the relationship between education and the level of preparedness for landslides in the Giritirto Village, Wonogiri District. The research technique used is a survey using a questionnaire. The number of samples obtained in this study was 190 families with a simple random sampling technique. Technical analysis of data on the level of community or individual disaster preparedness uses the calculation of the average preparedness index while determining the relationship between education level and landslide preparedness using the correlation analysis method.

The relationship between education and knowledge of landslide preparedness in Giritirto Village, Wonogiri District, gets a product-moment correlation value of $r = 1.0$, which is very high (Maryanti et al., 2017). Another study aimed at Understanding the Effect of Education Mitigation of Disasters Land erosion against Preparedness Society in the Rural Melung District of Kedungbanteng Regency of Banyumas. Methods: This study uses quantitative methods with quick experimental designs through the one-group pretest-posttest design approach. The test used in this research is a paired sample t-test with several 50 respondents who were taken by purposive sampling. Results: Result in statistical test $p\text{-value} = 0.0001$ ($p\text{-value} < 0.05$), which means significant landslides disaster mitigation education to the knowledge society in the village of the Melung District, Kedungbanteng, Banyumas Regency. This influence is indicated by an increase of 5,640 points from the score before training of 6,140. The difference of 5,640 is statistically significant (Ariani & Endiono, 2020).

RESEARCH METHOD

This type of research used by researchers is a quantitative study with a cross-sectional research design. The research was conducted with the head of the Soka hamlet family, Hargowilis Kokap Kulonprog Village, who met directly by filling out a questionnaire. The research was conducted on December 24 – December 25, 2022. The population in this study were heads of families in Soka Hamlet, Hargowilis Kokap Kulonprog Village. When a landslide occurs, the role of the family head is crucial to save and secure his family members from a landslide disaster life-threatening and immediately evacuate to a safer place. The number of heads of families in Hargowilis Kokap Kulonprogo Village is 137 heads of families. A sample size of 102 was obtained using the Slovin formula. The sampling technique used in this research is purposive sampling. Primary data was obtained directly by distributing questionnaires. The research instrument was in the form of a questionnaire containing questions to be answered by the respondents. There are two research instruments: Research Instruments Measuring Knowledge and Research Instruments Measuring Preparedness. This instrument has been tested for validity and reliability, with the results of testing the validity of the variable knowledge and preparedness with a value of r to $>$ from the r table, namely r to > 461 —the reliability test results with a value of Crombach's Alpha knowledge of 0.948 and preparedness of 0.974. The statistical analysis used is the Chi-Square test.

FINDINGS AND DISCUSSION

Respondent characteristics (Age, Gender, Last Education, Occupation, Knowledge, and Preparedness)

Based on the age characteristics, most of the respondents were aged 50-59 years, namely 26 people (25.6%). The gender of majority of respondents was male, namely as many as 84 people (82.4%). The education of most respondents had secondary education (SMA/SMK), namely 43 people (42.2%). Most of the respondents' jobs are farmers, namely 52 respondents (51.0%). Meanwhile, most of the 47 respondents (46.1%) had adequate knowledge of disaster because the respondent's score was 56% - 75%. Furthermore, disaster preparedness mostly has high preparedness; 66 respondents (64.7%) are said to be high because the respondent's index value is

80-100, as seen in table 1.

The factors that affect knowledge and preparedness in dealing with disasters show that gender has nothing to do with knowledge (Yeni,2015). Based on the research, the factors that affect an individual's or a person's preparedness are education and age. These are why a person's preparedness results from one study differ from other studies (Sihimbing 2020).

Table 1. Characteristics of The Respondents

Description		frequency	frequency
Age (years)	50-59	26	25.5
Gender	Male	84	82.4
Work	Farmer	52	51.0
Disaster Knowledge	Sufficient	47	46.1
Disaster Preparedness	High	66	64.7

Source: Analysis results in 2023

Relationship between Landslide Disaster Knowledge and Disaster Preparedness in Hargowilis Kokap Kulonprogo Village

Most respondents had sufficient knowledge, namely 71, with cross-tabulation results between knowledge and preparedness. The result was that respondents had sufficient knowledge with high preparedness were 38 (53.5%). The results of the statistical chi-square test with fisher's exact test obtained a value of $p = 0.001$, which means it is smaller than the value of $\alpha < 0.05$; thus, this shows that statistically, there is a relationship between knowledge and preparedness for landslides in the village of Hargowilis Kokap Kulonprogo. This is by research conducted by Yin, Chen, & Chen (2018) entitled A study of the relationship between landslide knowledge and preparedness among residents in Hong Kong. This study shows that better knowledge about landslides correlates with better preparedness in dealing with landslide disasters in Hong Kong, where the results of other studies also show that this study shows that better knowledge about landslides and a positive attitude towards preparedness correlates with better preparedness for landslides in Nepal (Thapa & Murayama, 2018).

This is in line with the theory according to Notoadmojdo et al. (2012), which states that one that influences preparedness is knowledge. Education is needed to gain knowledge, for example, things that support health to improve quality of life. Knowledge can affect a person, including a person's behaviour regarding lifestyle, especially in motivating attitudes to participate in development in general, the higher a person's education, the easier it is to receive information (Oswald & Ruiz, 2017; Samarakoon et al., 2019; Sihimbing, 2020).

Based on research, several factors influence knowledge, namely age, level of education, occupation, interests, experience, and sources of information. The factors that influence a person's preparedness are education and age. This is in line with this study's results that some respondents had high knowledge, but low levels of preparedness and vice versa and some respondents had low knowledge but high levels of preparedness.

Table 2. Relationship between Landslide Disaster Knowledge and Disaster Preparedness

Knowledge	Preparedness						P
	High		Sufficient		Total		
	N	%	N	%	N	%	
Good	28	90,3%	3	9,7%	31	100%	0,001
Enough	38	53,5%	33	46,5%	71	100%	
Total	66		36		102		

Source: analysis results in 2023

CONCLUSIONS

There is a significant relationship between knowledge of landslide disasters and disaster preparedness in Hargowilis Kokap Kulonprogo. This research can provide information about the relationship between knowledge and preparedness for landslide disasters so that people can understand the importance of having sufficient knowledge and good preparedness in dealing with this disaster. The limitation of this research is that the analysis is not yet in-depth, and has not studied other factors related to preparedness, so the suggestion for further research is to analyze other factors related to preparedness for landslide disasters.

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