The Relationship between Demographic Characteristics and Disaster Preparedness for Facing Landslides in Rural Areas of Indonesia

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ABSTRACT

Indonesia, positioned amidst two oceanic continents, experiences varying rainfall intensities due to its tropical rainy climate, significantly impacting soil stability and rendering it prone to landslides. This study investigates community preparedness for landslides, focusing on demographic characteristics' influence. We used cross sectional method with utilizing an observational analytic approach. The data was collected from 89 respondents using the LIPI-UNESCO/ISDR questionnaire. The sampling technique used is simple random sampling using a computer application. Data analysis uses Spearman rho analysis to determine the correlation of each variable. Findings reveal a significant correlation between age and education with disaster preparedness, whereas previous disaster experience showed no correlation. Most respondents displayed inadequate preparedness, indicating a pressing need for enhanced disaster management efforts. The study underscores the imperative for targeted interventions to bolster community resilience, emphasizing education and awareness initiatives to bridge preparedness gaps. Overall, the findings provide valuable insights for policymakers and disaster management authorities in formulating proactive strategies to mitigate landslide risks and enhance community resilience in rural areas.

Keywords: demographic characteristics; disaster preparedness; landslides

INTRODUCTION

The Indonesian region is located between two oceanic continents with tropical rainy weather resulting in variations in rainfall intensity. The intensity of rainfall will greatly influence soil stability (Sitepu et al., 2017). Indonesia's tropical rainy climate can make Indonesia vulnerable to landslides (Kumalawati, 2016). Indonesia is an area that is vulnerable and at high risk of disasters. Disasters that occur in Indonesia include landslides, earthquakes, floods, and others (Husna, 2012). There were 331 cases of landslides in Indonesia from January to August 2021. And in East Java Province there were 33 cases of landslides (Badan Nasional Penanggulangan Bencana, 2021). Based on data from BPBD Probolinggo Regency (Badan Penanggulangan Bencana Daerah, 2021), there were 20 landslides recorded from January – July 2021 in Probolinggo Regency. Sariwani Village experienced landslides in 2008, 2010 and 2018, with the largest landslide disaster in 2010, this village is one of the villages affected by landslides that needs to be paid attention to in Sukapura District because the village is located at an altitude of approximately 800 - 2300 meters above sea level surrounded by highlands (Badan Penanggulangan Bencana Daerah, 2020).

The high level of population density in hilly areas can cause pressure on the ecosystem. Landslide disasters are intense in areas with high topography (Sumana et al., 2020). The high slope factor supported by high rainfall can make Sukapura District one of the areas prone to landslides in Probolinggo Regency (Effendi & Hariyanto, 2016). Community preparedness in facing landslides can be assessed from residents' interpretation of the level of vulnerability to landslides in their area, if in an area that has a high level of landslides but the level of knowledge about landslides in the community is still low, then it can have an impact. bad for the people living in the area, the lack of awareness of the community with a high level of landslide vulnerability can cause material and material losses caused by the disaster and is also caused by the low level of knowledge and mindset of the community in dealing with disasters (Fitria et al., 2017).

One of the causes of landslides in Sariwani Village is during the rainy season because the rainfall is quite high in the village, making the land unable to hold enough water, causing landslides. Adverse impacts such as damage to the condition of the physical environment and society will occur when landslides occur that are not prevented by the community itself. The impact of this landslide has the potential for subsequent landslides to occur. Therefore, high community preparedness is needed to anticipate land disasters (Dianti, 2019). This is proven by people still being confused about finding a safe place and what to do when they experience a disaster. Researchers are interested in analyzing the relationship between community characteristics (age, education, and previous disaster experience) and community preparedness for landslides in rural areas of Probolinggo Regency, Indonesia.

METHOD

Research Design
The research design used in this research is observational analytic with a cross sectional approach.

Population, Sample, and Sampling Technique
The population used in the research was 1391 living in Sariwani Village, Probolinggo. The sample in this study was people who met the inclusion criteria based on age 17 - 55 years, so the results were 89 respondents based on the Slovin formula. In this research, a simple random sampling technique was used using the Wheel of Names application to make it easier for researchers to determine samples that fall within the research criteria.

Instrument
The data collection tool used to measure community preparedness is the LIPI-UNESCO/ISDR questionnaire (Nugroho, 2007). This questionnaire refers to a conceptual framework that aims to determine the preparedness of the Sariwani village community for landslides. In this questionnaire, there are 32 questions related to factors that influence community preparedness, namely knowledge and attitudes, emergency response plans, disaster warning systems, and resource mobilization. In the knowledge parameter in the form of a statement with a rating of "correct" it is given a value of 1, and if it is "wrong" it is given a value of 0, for parameters of emergency response plans, disaster warning systems and resource mobilization in the form of questions with a rating of "yes" it is given a value of 1 and if it is "no" given a value of 0.

Data Collection
The data collection procedure was carried out in the following stages. First, researchers obtain permission to conduct research. Then, researchers conducted door-to-door inquiries with respondents who met the predetermined inclusion criteria. Researchers ensure that all research implementation follows the government's recommended COVID-19 health protocols. Next, the researcher explained the aims and procedures of the research in detail to potential respondents. If the respondent agrees to participate, the researcher provides informed consent and explains how to complete the questionnaire. Printed questionnaires were used for data collection. If respondents experienced difficulties, the researcher helped by reading the questions and recording their answers. After respondents fill out the questionnaire, the researcher ensures all items are correctly filled in. Data was collected in January 2022, followed by further data processing and analysis.

Data Analysis
This research uses the Spearman Rank correlation test. Spearman Rank is a test used to test the existence of a relationship or correlation between two variables on an ordinal data scale.

Ethical Clearance
This research has been ethically tested and meets the requirements for ethical eligibility through the online Health Research Ethics Commission at the Faculty of Nursing, Universitas Jember. This research received a letter of ethical suitability number 175/UN25.1.14/KEPK/2021.

RESULTS

Of the total 89 respondents, age indicated that the largest distribution was in early teens, namely 17 - 25 years old, 25 (28.1%). Then, the respondents' last education was dominated by elementary school education, numbering 52 (58.4%). Previous disaster experience with landslides >2 times was 56 respondents (62.9%) (Table 1).

Table 1. Characteristics of Respondents Based on Age, Gender, Education, and Previous Disaster Experience (n=89)

Characteristics of participants	Frequency (n)	Percentage (%)
Age		
17-25 year	25	28.1
26-35 year	20	22.5
36-45 year	21	23.6
46-55 year	23	25.8
Education level		
Not attending school	3	3.4
Elementary school	52	58.4
Junior high school	20	22.5
Senior high school	14	15.7
Previous Disaster Experience		
Never	4	4.5
1-2 times	29	32.6
>2 times	56	62.9

Table 2 shows data on community preparedness for landslides in Sariwani Village, the majority of which are less prepared, 43 (48.3%), community preparedness data in the nearly ready category 22 (24.7%), community preparedness data in the ready category 16 (18%), data on community preparedness in the very ready category 8 (9%).

Table 2. Community Preparedness for Landslide Disasters (n=89)

Indicator	Frequency (n)	Percentage (%)
Disaster Preparedness		
Very ready	8	9
Ready	16	18
Almost ready	22	24.7
Not ready	43	48.3

Table 3 shows the correlation test results using the Spearman rank test on demographic characteristics and community disaster preparedness. The results of the analysis showed that there was a significant relationship between age and education on landslide disaster preparedness (p value < 0.05). Meanwhile, previous disaster experience has no correlation with community disaster preparedness (p value > 0.05). A positive correlation value was obtained for the characteristics of age and education, which means that the higher the age and education, the higher the community's disaster preparedness.

Table 3. Relationship between Demographic Characteristics and Community Preparedness for Landslide Disasters (n=89)

Characteristics	Community Preparedness	
	p-value	R
Age	0.005	0.293
Education Level	0.000	0.411
Previous Disaster Experience	0.660	0.047

DISCUSSION

Based on the results of data analysis in this research on 89 respondents, it was found that community preparedness showed that 43 (48.3%) needed to be prepared. The results of this research are the same as previous research, showing

that community preparedness for landslide disasters was less than 51 respondents (58%) out of a total of 88 respondents (Sumana et al., 2020). In this research, community preparedness still needs to be improved, this is due to the lack of optimal empowerment of every element in the community, so there needs to be improvements related to disaster management preparedness in several aspects. Carter stated that preparedness is an action that allows all elements, such as organizations, governments, individuals, and society to respond to disaster situations quickly and effectively (Muis & Anwar, 2018). Preparedness actions include maintaining existing resources, training communities to reduce the negative impacts caused by disasters and preparing disaster management plans.

In this study, age has a significant relationship with disaster preparedness. This is in line with previous research which explains that there is a relationship between age and the preparedness of community health center nurses in facing flood disasters (Septiana & Fatih, 2019). Productive age is the age where a person has more time to read and has good comprehension skills so that he has the potential to have better knowledge than other age ranges (Nastiti et al., 2021). At productive age, a person undertakes more of the learning process so that they have individual experience. A person's experience increases over time so that the older a person is, the more experience the individual has (Rohimah et al., 2021). However, age is not the main factor influencing a person's knowledge level about disaster preparedness (Budhiana et al., 2021). Researchers are of the opinion that adulthood is a person's productive age because of the development of a person's thought patterns and behavior in terms of disaster preparedness. So as people get older they have more experience in dealing with landslides.

In this research, response education is also related to landslide disaster preparedness. This is in accordance with previous research which explains that there is a relationship between education level and landslide disaster preparedness in Gilitirto Village, Wonogiri District (Maryanti et al., 2017). Other research also explains that there is a relationship between education level and community preparedness in facing flood disasters (Nastiti et al., 2021). The higher the education, the greater the potential for community preparedness (Cahyani & Suharini, 2021; Haristiani et al., 2023; Yunanto et al., 2022). The research results found that the number of respondents with low education was greater than those with higher education. Then, from the public's perception, there is also a need for more information regarding preparedness, which results in a lack of community preparedness in facing landslide disasters. Different levels of education can influence disaster vulnerability directly and indirectly (Hoffmann & Blecha, 2020). A person's better level of education is related to various vulnerability outcomes, such as levels of preparedness, evacuation and relocation, reactions to early warnings, ability to cope when disasters occur and adaptation to environmental changes (Finali et al., 2020; Hoffmann & Blecha, 2020).

The researcher believes that there is a relationship between education and community preparedness because the research results showed that the number of respondents with low education was greater than those with higher education. Then, from the public's perception, there is also a need for more information regarding preparedness, which results in a lack of community preparedness in facing landslide disasters. Low education is one of the factors causing the lack of knowledge from the community which causes a lack of information regarding preparedness regarding disaster warning information and a lack of community participation in landslide preparedness disaster warning training.

Previous disaster experience has no correlation with community disaster preparedness. This is in line with previous research which also explained that there was no relationship between experience of flood disasters and community preparedness for facing floods. Other research also proves that there is no relationship between previous disaster experience and preparedness in facing flood disasters with a p-value of 0.256 (Nastiti et al., 2021). According to Jean Piaget, he explained that when a person has gone through many problems in his life, his thinking and knowledge will further develop (Nastiti et al., 2021). A person's view of events around their environment will result in an experience. This experience will be a reference for a person in carrying out activities or activities in the future (Darmawan, 2013). Based on the research results, it was found that the majority of people had previous disaster experience >2 times, but in terms of preparedness, the results showed that they were less prepared, which resulted in there being no relationship between previous disaster experience and community preparedness. In the research results, it was found that one of the factors causing the community's lack of preparedness in facing landslide disasters was the aspect of the disaster warning system and resource mobilization. Previous research explains that disaster early warning is a series of activities that provide warnings to the public as soon as possible about the possibility of a disaster occurring in a certain place. This is in contrast to the research results obtained because there is still a lack of information sources for landslide disaster warnings, there are no traditional or local warnings when landslides occur, and there is minimal information regarding landslides from television/radio, sources are local or WhatsApp and people rarely participate in disaster warning or landslide preparedness training (BNPB, 2015).

In this study, researchers can conclude that there is no relationship between previous disaster experience and community preparedness due to the lack of a disaster warning system and resource mobilization in the community, so that

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even though the community has experienced disasters more than twice, the community still lacks information about disaster warnings. landslides, the absence of traditional or local warnings and the lack of community participation in disaster warning/landslide preparedness training.

CONCLUSION

This research shows that rural area communities are still less prepared for landslide disaster preparedness. There is a significant relationship between age and education and community preparedness for landslides, and there is no relationship between previous disaster experience and community preparedness for landslides.

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