

## DISASTER PREPAREDNESS TOWARDS COMMUNITIES' ANXIETY (A LANDSLIDE CASE STUDY IN LAMKLENG VILLAGE, ACEH BESAR)

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### Abstract

*The impacts of landslide are loss of life, people and livestock get injury, infrastructure, agricultural land, housing damage, economic loss, and anxiety experienced. Anxiety will have negative impacts, such as panic and respiratory disorders. This study aimed to analyze the correlation between disaster preparedness and anxiety, the effect of disaster preparedness on anxiety, the level of community disaster preparedness, and the level of community anxiety. This study used a correlational quantitative research design. A questionnaire of Google forms was used as a data collection technique. LIPI-UNESCO/ISDR was a parameter scale for preparedness variables, and HARS (Hamilton Anxiety Rating Scale) for anxiety variables. The total number of respondents was 74, and a random sampling technique and Slovin's formula were used to select the sample for this study. Data sources are secondary data and primary data. Descriptive statistics, univariate analysis, and Pearson product-moment were used for analyzing the data. The disaster preparedness in Lamkleng was in the almost ready category with an index of 63, and the community's anxiety level was 85.1% and in the serious category, and there was a relationship between disaster preparedness and anxiety.*

**Keywords:** *preparedness, anxiety, landslide*

### 1. INTRODUCTION

Indonesia is one of the country that has higher potential disasters. It is located at the junction of three major tectonic plates: the Indo-Australian Plate, the Eurasian Plate and the Pacific Plate. Tectonic plates cause a series of volcanoes along the islands of Sumatra, Java-Bali-Nusa Tenggara, North Sulawesi, Maluku and Papua (Caraka et al., 2021).

The international agency under the United Nations (UN) that handles disasters internationally is UNISDR. This institution defines a disaster as a serious disruption to the functioning of society involving human, material, losses and economic or environmental impacts, which exceed the ability of those affected by the community or society to cope using their resources (Coppola, 2015).

Aceh is a disaster-prone area. The geological and geographical conditions of the Aceh region are in the ring of fire and can cause several volcanoes and subduction zones, being the epicenter of earthquakes and tsunamis (BPBA, 2019). The disasters that ever occurred in Aceh were tsunamis, floods, earthquakes, volcanic eruptions, landslides, and droughts (Nasaruddin et al., 2011). Based on the research results, one of the areas prone to earthquakes and landslides was Takengon. The Central Aceh earthquake on July 2, 2013, caused landslides and 39 fatalities. The landslide was caused by rainfall and slope (Pamela et al., 2018).

Landslide is a process of displacement rock mass (soil) due to gravity (gravity). Landslides occur because of disturbances balance of forces acting on the slope (Naryanto, 2011). landslides are caused by seismic activity, namely earthquakes and high rainfall (Pareta, 2012). the rainfall landslide potential will be different in each area, and will greatly affect areas that are prone to landslides compared to non-susceptible areas landslides even with the same amount of rainfall (Sipayung et., al, 2014). The rainfall that needs to be watched out for in landslide-prone areas is >

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300 mm/3 days. With accurate and continuous rainfall information, it is hoped that this will become the basis for early warning for people living in landslide-prone areas (Paimin, 2009).

The occurrence of landslides in Lamkleng Village was caused by the soil being saturated with water. This incident was closely related to the high rainfall of the last week in the Aceh Besar region, resulting in the soil becomes unstable. The landslide was about 30 meters from the Aceh's river (Krueng). The fracture extends along the river. The earthen cliff sloped to the river, and its depth increased from 40 to 70 cm, which signified that soil continued to move towards the river. In this condition, the people living around the place will evacuate to avoid unwanted things. There were three houses whose condition was risky because it was on collapsing soil lines (Yarmen, 2021).

The impact of landslides was life loss, people and livestock injured, infrastructure, agricultural land and housing damaged, and economic losses (Hilton, 2011). Landslides damage infrastructure and can cause psychological disturbances such as anxiety. It was especially for the community who lived in landslide-prone areas.

Anxiety is a future-oriented mood state associated with preparation for possible negative events that will come (Fink, 2016). Anxiety will have a negative impact, such as panic disorder and respiratory problems (Brenes, 2003). Anxiety can happen to everyone and change their life, and it can also occur in a short or prolonged time.

## **2. IMPLEMENTATION METHOD**

This research used a quantitative correlational approach. This prospective comparative study was conducted in the people of Lamkleng Village, Cot Glie District, Aceh Besar District from September 2021 to September 2021. A total of 74 subjects were in this study.

### **2.1 Sample and Population**

The total population in Lamkleng Village, Cot Glie District, Aceh Besar Regency was 291 people. This study used the Slovin formula to determine the number of research samples. Therefore, the total sample was 74 respondents. The following was the Slovin formula:

$$n = \frac{N}{1 + N (e)^2}$$

In which:

n = Measure of sample

N = Measure of population

e = Error level

### **2.2 Procedure methodology**

The sources of data used were secondary and primary data. Secondary data is a data source arranged in the form of documents such as the village profile of Lamkleng. Primary data is a source of data collected by researchers from questionnaires. This study used questionnaires as the instrument of data collection. Questionnaires are a useful tool to assist researchers in gathering information structured with questions.

### **2.3 Statistical analysis**

#### **1. Descriptive Statistical Analysis**

Descriptive statistical analysis is statistics used to analyze data by describing or illustrating the data that has been collected without intending to make general conclusions or generalizations (Sugiyono, 2013).

## 2. Univariate Analysis

The index analysis was used as the data analysis technique for this study. The index assessment was carried out in two stages, the first measuring each parameter's index and the second calculating the combined index of parameters. Measure the index of each parameter using the following formula (Fhathird & Desfandi, 2022):

$$\text{Index} = \frac{\text{Total real parameter score}}{\text{Maximum parameter score}} \times 100$$

Meanwhile, to calculate the combined index value of the four parameters is calculated using the following formula:

## 3. Pearson Product Moment Correlational Analysis

This study used Pearson Product Moment correlation analysis to find the correlation between the two variables. The requirements for using this analysis are the data are selected randomly, normally distributed, and linked to the same subject. Decision-making in the normality test is based on the significant value of a variable more than the significant level of 5% ( $> 0.050$ ), the variable is normally distributed, and if the significant value of a variable is less than the significant level of 5% ( $< 0.050$ ), then the variable is not normally distributed (Riduwan, 2014). Based on the results of the SPSS output, the significant values in the tests of normality are 0.164 (X) and 0.504 (Y)  $> 0.050$ . Thus, the conclusion is the data is normally distributed.

In addition, the researcher used Pearson product moment analysis to find the correlation between variables. The decision-making is based on the comparison score of t test and t table; if t test  $>$  t table, then  $H_0$  is rejected, and  $H_a$  is accepted with a significance level of 0.25, it can conclude that there is a significant correlation. If t test  $<$  t table, then  $H_0$  is accepted,  $H_a$  is rejected with a significance level of 0.25, and the conclusion is that there is no significant relationship.

The formula for finding the t table is  $DK = n-2 = 74-2 = 72$ , and the result of the t table = 0.679 is obtained.

## 3. RESULTS AND DISCUSSION

### 3.1 Descriptive Statistical Analysis

#### 1. Preparedness Descriptive Statistical Analysis

Based on the result of frequency distribution data on the knowledge aspect, the highest percentage was in question 1. The community understands that soil creep is a type of landslide that often occurs on cliffs near roads. Meanwhile, the lowest percentage was in question 4. The community does not know that the emergence of a disease outbreak is a disaster that occurs after a landslide.

In the emergency response plan aspect, the highest percentage was in question 4. It mentioned that the availability of food and drink in an emergency if a landslide occurs in Lamkleng Village. The lowest percentage was in question 11. There were only 26 respondents who mentioned that they had held a landslide response practice in Lamkleng Village.

Moreover, the disaster warning aspect result showed the highest percentage was in question 2. There was an availability of information sources related to landslide warnings in Lamkleng Village. The information was shared through the village government, radio, TV, or print media. In contrast, the lowest percentage was in question 5, in which only 14 of 74 respondents participated in landslide warning training.

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The last result of disaster preparedness was the aspect of resource mobilization. It showed the highest percentage of questionnaire answers was in question 7. The Lamkleng Village societies have relatives or friends ready to help when a landslide disaster occurs. Then, the lowest percentage was in question 2. Only 16 of 74 respondents have received material on landslide disaster preparedness.

## **2. Anxiety Statistical Descriptive Analysis**

The explanation of the statistical analysis result was divided into some categories. First, In feeling anxious, the component was easy to handle; about 32.4% of people do not experience it, and 5.4% do. Then, the tension aspect was dominated by the easily startled component, which amounts to 32.4% of people who experience it, and the lowest part was 5.4% of people who experience crying easily.

The feeling of fear society did not experience scare of traffic crowds; about 37.8% and 2.7% of people do. Then, sleep disturbance, the component of nightmares, was dominated by 37.8% of people, and the lowest percentage is 4.1% of people who experience fatigue when they wake up. In the intelligence disorder aspect dominated by people's poor memory of components, 35.1% and the lowest percentage was 4.1% of people who had difficulty concentrating. Then, the feeling depressed (moody) was dominated by the reduced pleasure component of hobbies, 37.8%, and the lowest percentage was 1.4% of people who experienced a loss of interest.

Furthermore, In somatic symptoms (muscle), the people who do not experience the teeth grinding component 40.5% but somatic (sensory) symptoms, 40,5 %, dominated by the blurred vision component. Then, regarding the red face component, 40.5% of people who do not experience it, and the lowest percentage were people who experienced the tinnitus component (ringing in the ears), about 2.7%.

The next aspect was cardiovascular symptoms (heart and blood vessels). The result showed that the component of the heartbeat disappears (stops for a moment), which amounts to 43.2% of people who do not experience it. The lowest percentage was the component of chest pain, with 1.4% of people experiencing it. Then, 1.4% of people experience a hardened pulse, and 1.4% feel lethargic or weak, like they are about to faint.

Based on respiratory symptoms (breathing), the component of feeling depressed or narrowing in the chest showed 41.9% of people do not experience it. However, gastrointestinal (digestion) symptoms were dominated by nausea, and 39.2% of the people experienced it. Then, 39.2% of the people experienced soft feces; the lowest percentage was the stomach component, about 0%.

Moreover, the genitourinary symptoms (urinary) aspect was dominated by the component impotence, which 55.4% of people do not experience, and the lowest percentage was the component unable to hold urine, about 0%. In the aspect of autonomic symptoms, the headache component was dominated by 44.6% of people who experience it, and the lowest percentage is the red face component, which is 0%. In the behavioral aspect carried out by the wrinkled eyebrows component, 39.2% of the people experienced it, and the lowest percentage was the tense face component, about 1.4% of the people who experienced it.

## **3.2 Univariate Analysis**

### **1. Disaster Preparedness Analysis Level**

The knowledge parameter was dominated by measuring the index results of each parameter in the preparedness variable. The community understands the characteristics, causes, impacts and prevention of landslides. The lowest index was on the resource mobilization parameter. The

minorities of people who have attended disaster preparedness seminars do not obtain print and electronic media information about disaster preparedness and do not have skills in evacuating victims. The index value of each parameter in detail can be seen in the following table:

**Table 1.** Index of Landslide disaster preparedness

No.	Parameter	Respondents Real Score	Index	Category
1.	Knowledge	411	79	Ready
2.	Emergency Response Plan	486	59	Almost ready
3.	Disaster Warning System	137	37	Unready
4.	Resource Mobilization	219	36	Unready

## 2. Knowledge

Table 1 showed the index value was 79 on the knowledge parameter related to landslides in Lamkleng Village was included in the ready category. The community understands the characteristics, causes, impacts and prevention of landslides. In 2017 Adiwiyata was conducted and taken as the previous study of this research. The results mentioned the disaster knowledge of the people of Lawanggingtung Village, South Bogor District, Bogor City. Individually, disaster knowledge has good criteria and was evidenced by a score of 42.4% (Adiwijaya, 2017).

Another previous research by Andini in 2019 entitled the relationship between knowledge and landslide disaster preparedness for adolescents in the Bukik Cangang Village, Bukittinggi City. The results indicated that adolescents' knowledge level of landslides was in the ready category. Teenagers who have this level of knowledge were 71% (Andini, 2019).

## 3. Emergency Response Plan

In the emergency response plan parameters in table 1, the index value of 59 related to landslides showed that the Lamkleng village community was in the almost ready category. This category indicated the emergency response plan needs to improve to reduce the landslide impact.

This result was in line with previous research conducted by Fhatird & Desfandi entitled community preparedness in dealing with the tsunami disaster in Gampong Lam Teungoh, Peukan Bada District, Aceh Besar Regency. It found the emergency response planning aspect was in the unprepared category with an index value of 50 (Fhathird & Desfandi, 2022).

## 4. Disaster Warning System

The index value of the disaster warning system parameter was 37, as showed in table 1. It indicated that the people of Lamkleng village were in the unprepared category. This category explained that the communities need an avalanche warning system to prevent the impact of the disaster.

Providing warning signs or communities' understanding of direct action in handling sudden disasters when an alarm rang or was turned on was categorized to a good management warning system (Nanik Handayani, 2021). This system purposed to relieve the impact of disasters (Fhathird & Desfandi, 2022).

Based on the results of research conducted by Sermi Wey et al. with the title "Landslide disaster early warning system based on wireless sensor network in Sentani District, Jayapura, that land displacement can be displayed on a laptop screen with an alarm system (indicator lights and

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pulleys) processed using a rotary encoder extensometer sensor. The detection device provides output or warning information about landslides (Weya, 2019).

One example of disaster preparedness was the Internet of Things Technology (IoT) which consists of prediction and early warning. This system is used for landslide prevention, and sensors will be installed in the places that experience landslides according to data from the GIS map. The sensors periodically send data to the server, and then the data was combined from data analysis. The data of landslides parameter with the IoT system matches a warning will be sent via the internet to an endpoint in the form of an integrated smartphone into the internet network (Ryan et al., 2020).

**5. Resource Mobilization**

Table no 1 showed the index value of 36 on the parameter of resource mobilization. It indicated that the people of Lamkleng Village fall into the unprepared category in landslide preparedness. The people majority in Lamkleng Village do not have life insurance or savings. Moreover, only 23% of the local community has attended seminars related to landslides.

This situation mentions Lamkleng Village Community categorized as unprepared in facing a landslide. To qualify as a disaster preparedness village, the community should prepare all needs, such as funds and other infrastructure, to support the preparedness system in natural disasters (LIPI-UNESCO/ISDR, 2006). The combination or overall index value of several parameters showed as follows:

$$\begin{aligned}
 P_n &= (0,45 \times 79) + (0,35 \times 59) + (0,15 \times 37) + (0,05 \times 36) \\
 &= 35,55 + 20,65 + 5,55 + 1,8 \\
 &= 63
 \end{aligned}$$

Based on the result of four indexes, 63, Lamkleng Village's disaster preparedness includes the almost ready category. It was supported by the results of research conducted by Wulandari in 2019 entitled Analysis of Student Preparedness in Facing Drought through Booklet Media. Calculation of the combined student preparedness index showed that the preparedness of Singkawang 1 Public High School students in dealing with natural disasters before being given the booklet media was 62.57. It is included in the "almost ready" category (Wulandari, 2019).

**6. Analysis of Anxiety Level**

According to recapitulation results, the highest joint anxiety aspect was 85.1% and included in the severe category. It showed that the people of Lamkleng Village experienced anxiety during landslides in 2020. The lowest percentage is in the mild and moderate categories, 1.4%. The table below shows the result in detail:

**Table 2.** Anxiety respondents recapitulation

No.	Category	F	%
1.	Heaviest	63	85.1
2.	Heavy	4	5.4
3.	Medium	1	1.4
4.	Light	1	1.4
5.	None	5	6.8
<b>Total</b>		<b>74</b>	<b>100</b>

Based on the results in table 2, an overview of the communities' anxiety levels in Lamkleng Village, Cot Glie District, Aceh Besar Regency, 85.1% had very severe anxiety, 6.8% experienced no anxiety, 5.4% had severe anxiety, 1.4% had mild anxiety, and 1.4% had moderate anxiety.

These results are supported by Xiao et al., (2020) research in China. The results showed that 82.9% of respondents did not experience anxiety, 12.5% experienced mild anxiety, 3.2% had moderate pressure, and 1.4% was apprehensive.

Anxiety is present with depressed mood, loss of interest or happiness, decreased energy, low self-esteem, disturbed sleep and appetite accompanied by physical and psychological symptoms of anxiety. Anxiety often creates feelings that are not clear, so the level of anxiety felt by individuals will vary (Feist et al., 2018). Individuals who experience anxiety need help or effort to overcome this anxiety. The actions are with psychiatric psychotherapy, religious psychotherapy, psycho-pharma, somatic therapy, relaxation therapy, and behavior therapy (Jamil, 2015).

The result was in line with the results of research conducted by Suniarti Sunny & Sri Setyowati, namely the people of Imogiri, Bantul, Yogyakarta in March 2019 experienced anxiety, especially the affected people, so efforts to deal with it needed to be done (Suniarti, 2020). Another supporting research was US clients who experienced anxiety after the landslide disaster in the village of Margamukti Pangalengan that conducted by Hanafi. US clients experienced anxiety disorders characterized by worry and anxiety, which impact emotional, cognitive and physiological disturbances caused by past factors (Hanafi, 2020).

Moreover, it is also in line with the results of Bedriye's research on school-age children in Turkey, 2014. The results were that children's reaction after the earthquake disaster was to become irritable and self-deprecating, and changes in behavior such as dreaming about earthquakes and fear of being left inside: houses, auditory hallucinations, and difficulty sleeping (Bedriye, 2014).

### 3.3 Pearson Product Moment Correlation Analysis

The calculated t value (Pearson correlation) is  $0.985 > t$  table  $0.677$  with a significance level ( $\alpha$ ) = 0.25. It can conclude that there was a significant relationship between disaster preparedness variables and anxiety. The following table shows the detailed result:

**Table 3. Pearson Product Moment Correlation Test**

		<b>Disaster Preparedness</b>	<b>Anxiety</b>
Disaster Preparedness	Pearson Correlation	1	.985
	Sig. (2-tailed)		.000
	N	74	74
Anxiety	Pearson Correlation	.985	1
	Sig. (2-tailed)	.000	
	N	74	74

## 4. CONCLUSION

Based on the result of data analysis of this study, the conclusion can be drawn as follows:

- The calculated t value (Pearson correlation) was  $0.985 > t$  table  $0.677$  with a significance level ( $\alpha$ ) = 0.25. It can be concluded that there was a significant correlation between disaster preparedness variables and anxiety.
- The result showed that the t-value is  $48.112 > t$ -table value is  $3.970$  with a significance level ( $\alpha$ ) = 0.05. It means that there is a significant influence between disaster preparedness variables on anxiety.
- An index value was 79 on the knowledge parameter related to landslides. It indicated that Lamkleng village communities' were included in the ready category. The index value of 59 in the emergency response plan parameters showed that the people of Lamkleng village were in the almost prepared category. The index value of 37 in the Parameters of the disaster warning system showed that the people of Lamkleng Village fall into the unprepared category. The index value of 36 in the parameter of resource mobilization indicated that the people of Lamkleng Village were in the unprepared category. The calculation of the four index parameters was 63. Thus, the conclusion was Lamkleng Village's disaster preparedness included the ready category.

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- d. The anxiety level result of people in Lamkleng Village, Cot Glie District, Aceh Besar Regency found 85.1% very severe anxiety, 5.4% severe anxiety, 6.8%, 1.4% moderate anxiety, 1.4% mild anxiety, and 6.8% experienced no anxiety.

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