Analysis of the level of knowledge of disaster preparedness attitudes in dealing with the Gamalama volcano disaster among students in senior high schools in the city of Ternate

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Abstract. Natural disasters in Indonesia have been increasing annually, encompassing both geological and hydrometeorological events. One of the recurring natural disasters in Ternate City is the volcanic eruption of Gamalama Volcano. The Gamalama Volcano eruption has direct and indirect dangers for the community, particularly to high school students. The research aims are 1) to determine the knowledge and attitude of disaster preparedness in facing the Gamalama volcano eruption, and 2) to determine the influence of knowledge of disaster preparedness attitudes in dealing with volcanoes on students. This research uses a quantitative descriptive method with a cross-sectional approach and data collection techniques with purposive sampling. The instrument used was a questionnaire sheet on Google form. With a sample size of 150 students, the data analysis techniques are descriptive percentages and simple regression analysis. The research findings show that students' overall disaster knowledge is in the "good" category. The results of the simple linear regression analysis indicate a significant positive relationship between disaster knowledge and students' preparedness attitudes. It is essential to enhance disaster-related knowledge in schools located in areas vulnerable to the Gamalama Volcano eruption through formal education, ensuring that students are better prepared to respond effectively during disasters.

1 Introduction

Indonesia is an area vulnerable to disasters caused by natural factors, including volcanic eruptions, earthquakes, tsunamis, floods, landslides, non-natural factors and human factors, such as terrorist attacks or technological failures and so on [1]. Volcanic eruption is one of the serious problems for the Indonesian state, generally caused by being in the ring of fire. The area through which the ring of fire path will appear volcanic points caused by the meeting of plate plates that collide with each other which causes a volcano eruption [2].

The volcanic eruption disaster has had physical, psychological, economic and social impacts on the victims. Physical impacts include deaths, injuries, infrastructure damage and environmental damage. Social impacts can also occur, can be in the form of individualism,

increasingly tenuous public relations, selfishness and feeling dependent on help [3]. The psychological impact of volcanic eruptions such as anxiety about follow-up eruptions, depression, psychosomatic and problems in adjustment. People who experience volcanic eruption disasters, especially those that have repeated events, tend to experience psychological disorders in the form of mild to severe depression [4]. Such conditions cause the public to have knowledge in dealing with the danger of volcanic eruption disasters. The higher the knowledge of the community, the better prepared the community is in facing volcanic eruption disasters [5]. Currently, there is still very little knowledge of the community to bring survival items after the disaster occurs. This happened because of the lack of public knowledge about disaster preparedness bags [6].

In general, based on data submitted by (BNPB), 3,092 disaster events have occurred in Indonesia during 2021. These disasters include volcanic eruptions with 1 event, drought 15 events, earthquakes 32 events, tidal waves and abrasion 45 events, forest and land fires 265 events, landslides 632 events, extreme weather 804 events, and floods 1,298 events. These various disasters resulted in 95 people missing, 665 dead, 14,116 injured, and 8,426,609 people suffering and displaced. The impact of damage caused by bridge damage reached 438 units, offices 509 units, public facilities 3,704 units, and houses 142,179 units. Details of house damage, namely lightly damaged houses 97,647 units, moderately damaged 25,369 units, and heavily damaged 19,163 units. In 2021, the number of disasters decreased by 33.5 percent compared to last year which amounted to 4,649 events, but the number of people who died rose by 76.9 percent, which was 665 people [7]. The increase occurred in the number of fatalities, injuries, affected and displaced residents and damaged houses. Meanwhile, based on data released by BNPB for Ternate City, it has recorded as many as throughout 2021 with 4 incidents, the events were in the form of erupting mountains, landslides, earthquakes.

Ternate City has one of the regions included in Indonesia that has received a very serious disaster threat, one of which is a volcanic disaster, landslides. Gamalama volcano is one of the active mountains in Indonesia, because it is based on a very complex geological location so that Ternate City is often based on volcanic eruptions, while the eruption of Gamalama volcano has dangers both directly and indirectly. As for landslides that often occur in Ternate City because it is based on its topographic area, mountains and more and more vacant land that is often built by local residents.

In addition, formal educational institutions are one of the things that should be considered especially those affected by direct or indirect disaster hazards, therefore schools that are formal educational institutions should make earlier preparations, through increasing earthquake disaster preparedness. schools located near Disaster Prone Areas are among the main stakeholders responsible for building student preparedness. Because in principle, disaster preparedness is one form of a new paradigm for disaster management, so when disaster management has changed from response, disaster risk reduction will occur. With students' preparedness skills and abilities, students can indirectly protect themselves from the danger of the earthquake itself. in the opinion of [8]. Preparedness is one of the actions that can be taken before a disaster occurs is to prepare the community so that during a disaster losses and victims can be interpreted properly.

Knowledge, attitude is a good thing to deal with disasters, as one of the factors that become the main value for student preparedness is to anticipate earthquake disasters, because in increasing knowledge and good attitudes there are interrelationships between one another. According to research from [9], says that Knowledge and attitude are inseparable. These two factors are closely related; a person's knowledge of earthquake disaster preparedness will influence their attitude when a disaster strikes. In addition, an attitude based on knowledge will be able to be utilized in the long run. In addition, according to [10] states that Disaster events require knowledge by every individual and community. In addition, actions for the

prevention of a disaster are a equence of actions designed to anticipate disasters, involving systematic organization and the implementation of suitable and effective measures to mitigate the negative impacts of the disaster, including physical damage and loss of life. In addition, disaster preparedness involves various elements, such as individual knowledge, community involvement in disaster mitigation, and the necessary provisions. Another crucial aspect is disaster education, which includes socialization, training, and formal education, as well as disaster response and early warning systems. These elements form the foundational knowledge about disasters that both individuals and communities must acquire [11].

Considering that as an area that has a very high earthquake vulnerability in Indonesia, North Maluku Province, especially Ternate City in the 2018 Disaster Risk Index has been ranked 17th at the North Maluku Province level. It turns out that there are still many findings that are not followed regarding knowledge and attitudes towards good preparedness to deal with earthquake disasters. This has been found several research results that show that students' knowledge is still not good to deal with earthquakes [12]. In addition, the attitude of student preparedness to face disasters is not good [13]. It's a pity, it should be a school as role model is the frontline in Gamalama Volcano disaster management.

According to the aforementioned, it is necessary to formulate research objectives, namely: a) to find out the level of knowledge, attitudes and preventive measures related to volcanic eruption disasters Students in Ternate City? b) to investigate how the level of knowledge, attitudes, and preventive measures relevant to the volcanic eruption disaster of Students in Ternate City?

2 Methods

This research uses a type of quantitative descriptive research, where this research has been carried out in 3 Ternate City High Schools, which is in the Gamalama Volcano Disaster Prone Area of Ternate City. For the population in this study as many as 300 students spread from tenth grade to twelfth grade, while for the study sample was as many as 150 students. For the determination of the sample to be carried out using a method such as Issac and Michael, by matching the number of population according to the study population in the table, with an error level of 10% [14]. The sample for this study was selected using a purposive sampling method.

Data collection instruments in the form of questionnaires, both for knowledge variable instruments and student preparedness attitude variables. Questionnaires of knowledge variables and variables of student preparedness attitudes using questionnaires from [15] which have been modified. The number of knowledge variable questionnaires is 15 question items, with aspects measured including students' general knowledge related to Gamalama Volcano natural disasters, such as Understanding Volcano natural disasters, Causes of Volcano disasters and hazards caused, as well as types, types, sources, magnitudes, and locations of natural disasters. While the number of questionnaires for the students' disaster preparedness attitude variables was 15 question items, with aspects measured including plans to respond to disaster emergencies as well as relief and rescue.

The answers in the questionnaire use a Likert scale with answer scores that are strongly agree (score 4), agree (score 3), disagree (score 2), and strongly disagree (score 1). The instrument has been tested for validity and reliability using the Pearson and Cronbach alfa tests to 57 respondents with a significant level of 5% so that the value of the correlation coefficient table is obtained 0.261. The results of the knowledge instrument validity test show that the questionnaire instrument valid with the value R count = 0.396-0.676, which is > from the table R (R Table = 0.261) on all questions. The questionnaire was also reliable with a cronbach alpha value = 0.496. Likewise, the results of the validity test of the student preparedness attitude instrument showed that the questionnaire instrument was valid with a

value of r count = 0.347 - 0.601, which > from r table (r table = 0.261) on all questions. The questionnaire was also reliable with a value of cronbach alpha = 0.414.

Data analysis of this study used percentage descriptive analysis and simple regression analysis. Percentage descriptive analysis is used to find out how students' knowledge of the Gamalama Volcano disaster and how students' preparedness attitude in facing the Gamalam Volcano disaster. Descriptive percentage analysis with steps according to [16] as follows: Calculate the value of respondents and each aspect or sub-variable.

1. Recap value.
2. Calculates the average value.
3. Calculate the percentage by the formula:

$$\{[DP = \frac{n}{N} x\ 100]\} \qquad (1)$$

Information:
DP = Descriptive Percentage (%)
n = Empirical score (Score obtained)
N =Ideal Score for each question item

Table 1. Analysis Criteria

No	Score	Criterion
1	81.25 − 100	Excellent
2	62,50 - 81,24	Good
3	43,75 - 62,49	Not good
4	25 - 43,74	Bad

While simple linear regression analysis is used to determine whether or not there is an influence between disaster knowledge (X) on student preparedness attitudes (Y), analyzed with the help of SPSS software version 22, with a significant level of (α) = 0.05. This study will test the following hypotheses:
H_0: there is no influence between disaster knowledge and student alertness.
H_1: there is an influence between disaster knowledge and student alertness

3 Result and Discussion

3.1 Some of the results of the questions in this study are one of the answers that will be answered by respondents through the following results and discussions:

Table 2. Percentage Distribution of Student Knowledge Level

No	Student Knowledge Level	Frequency	
		N	%
1	Excellent	9	6,00
2	Good	136	90,66
3	Not good	3	1,98
4	Bad	2	1,33
Total		150	100

Based on the results of research in table 2 above about the percentage distribution that it is known that of the 150 students who will be used as a research subject it turns out to have

Most students answered as many as 136 students or 90.66% by having a level of knowledge related to the Gamalama volcano eruption natural disaster with a good category, while for the very good category as many as 9 students or equivalent to 6.00%, and the poor category as many as 3 students or 1.98%, in addition to the bad category as many as 2 students or 1.33%. so based on the results of the research obtained, overall disaster knowledge can be categorized as "Good" things can be seen with an average value of 81.24%.

Through the results of descriptive testing, the percentage obtained but there are some students who do not know about the Gamalama volcano disaster, so that it has a poor category value or a percentage with a value below the average of 62.49%. This is because the aspects that have been measured are not answered properly. Based on the average students whose categories are not good have not been able to answer less correctly than the 15 questions given, the average student only answers the right only from the aspect of the cause of the Mount Gamalama disaster, the types of sources of the Gamalama eruption. Based on the results of research that has been found to be obtained by, the average level of knowledge of students who are overall in the good category, only based on research subjects by receiving material from teachers about disasters in schools, especially the material that brings has something to do with the potential for natural disasters in the city of Ternate, such as the eruption of Mount Gamalama. According to [17] mentions that knowledge begins with an action and awareness of a student. This is done based on assumptions and maximum disaster knowledge capacity, so that students are ready to understand more about a disaster. This is also in line with [18] The mention of Knowledge is the result of understanding and can occur after people perceive an object).Perception takes place through the five senses: sight, hearing, smell, taste, and touch. Most human knowledge is acquired through the eyes and ears. Knowledge is closely related to education, where the higher a person's education, the wider the knowledge possessed. However, this does not mean that someone with low education also has low knowledge. A person's attitude can be determined through the object of thought and knowledge [19]. It is also according to [20] that students who have obtained disaster materials in school can increase their knowledge of disasters. In addition, students who live in bencan-prone areas can also affect students' knowledge of natural disasters, because students have realized that the area where they live, is prone to potential volcanic natural disasters. While the results of research conducted by [21] stated that students in the area around the Gunungapi natural disaster have good knowledge.

3.2 Based on the results of data analysis of students' disaster preparedness in facing the Gamalama volcano disaster, it can be seen as follows:

Table 3. Percentage Distribution of Student Disaster Preparedness.

No	Student disaster preparedness	Frequency	
		N	%
1	Excellent	28	18,66
2	Good	116	77,33
3	Not good	3	1,33
4	Bad	3	1,33
Total		150	100

Based on the results of data analysis on percentage distribution, it can be found that of the 151 students who will be used as research samples, it turns out that most of the 116 students or 77.33% have a disaster preparedness attitude in dealing with natural disasters Gamalama

volcano is included in the good category, besides that for the very good category, as many as 28 students or 18.66%, As for the category of less good 3 students or 1.33% and for not good as many as 3 students also or 1.33%/. Based on the results of the analysis, of course, it can be concluded that the students' disaster preparedness attitude as a whole can be categorized as "good", this can be seen from the number of acquisition rates with an average score of 78.33%.

Although there are still some students who have a disaster preparedness attitude, students in dealing with natural disasters Gamalama volcano is not good or the average score percentage is below 43.7%. This was found because some aspects measured by the student did not answer incorrectly. This is because of the 8 question items answered correctly, from 15 question items with the average student being able to answer correctly on the question item in terms of rescue.

The attitude of student disaster preparedness, through the results of research has had a good category value, as well as the results of student knowledge analysis, because of the good attitude of student disaster preparedness. while according to [22] has been influenced by the knowledge factor so that in the previous experience of students can only affect the attitude of disaster preparedness in students. This is also in line with Stating that the respondent's score with a disaster alert level has a good category means that the person concerned already has banana readiness because initially the person concerned has experienced a previous disaster event.

3.3 The Impact of Knowledge on Students' Preparedness For Disaster in Dealing with the Gamalama volcano disaster at Ternate City High School

Measuring the Effect of Knowledge of students' disaster preparedness in facing the Gamalama volcano disaster, this is measured using SPSS Statistics 22 can be presented in table 4 as follows:

Table 4. Results of Simple Linear Regression Analysis

Type		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Student Knowledge)	38,991	3,374		11,555	,000
	X	,103	,081	,104	1,267	,207
a. Dependent Variable: Y						

Based on the results of regression analysis that has been carried out in table 4, a calculated value of = 1.267 > t table 1.655 can be obtained, then the null hypothesis (H0) is rejected, thus that there is a positive and significant influence between disaster knowledge and student alertness. While the following F Test Anova test is presented in Table 5 as follows

Table 5. F test ANOVA

Type	Sum of Squares	Df	Mean Square	F	Sig.

1	Regression	33,643	1	33,643	1,605	.207b
	Residuals	3101,717	148	20,958		
	Total	3135,360	149			
a. Dependent Variable: Disaster Preparedness						
b. Predictors: (Student Knowledge)						

Based on Table 5, the calculation results show that the results of the F test for disaster preparedness to deal with disasters obtain a calculated F value of 1.605 and F table of 3.90 (df. N1.149). Because Fcalculate > Ftabel, it can be said that X's contribution is significant to Y. Furthermore, if the criterion uses a significance value (Sig.), then the significance value of the calculation is 0.05 while the significance criterion is So Based on the calculation results, disaster preparedness knowledge has influenced Ternate City High School students, especially in facing the Gamalama volcano disaster.

Table 6. Test results of Coefficient of Determination and Coefficient of Correlation

Type	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.104a	,011	,004	4,57794	,011	1,605	1	148	,207	1,622
a. Predictors: (Student knowledge), X										
b. Dependent Variable: Disaster Preparedness Y										

From table 6 it can be explained that the R value obtained is 0.104, meaning that between disaster knowledge and students' disaster preparedness has a strong relationship. This is because the better the level of knowledge of disasters students, the better the students' preparedness in dealing with natural disasters Gamalama Volcano. This table also presents the R Square value, or coefficient of determination (KD), which indicates the effectiveness of the regression model created by the interaction between the independent and dependent variables. The KD score obtained is 11.00% which can be interpreted that the amount of influence of disaster knowledge on student preparedness attitudes is 11.00%. The results of this study are almost in line with several studies, namely: [23] that disaster knowledge must be accompanied by family support so as to increase the disaster preparedness of the elderly in the face of firefighting disasters. While according to [24] Mentioning that knowledge and attitude to disaster preparedness have experienced an influence in dealing with a disaster, because basically knowledge and attitude of disaster preparedness have had value that becomes a factor in improving disaster preparedness, because low knowledge can cause low disaster preparedness value while good knowledge can increase individual preparedness that maximizes the worst risk if a disaster occurs [25]. In addition, someone who already has a standby attitude tends to be calmer so that things are threatened by [26]. In addition, knowledge of good disaster preparedness will be able to analyze the risk so that property losses and casualties due to natural disasters occur. An interesting solution is through interactive and effective so that respondents can know the eruption disaster preparedness [27]. We recommend that this method can be socialized to all students as an eruption disaster preparedness effort.

4 Conclusions

Based on the results of the research, overall students have “good” disaster knowledge. This is shown by the acquisition of an average student score of 90.66%. Also, the general disaster preparedness level of students falls within the 'good' category, with the average score achieved by students reaching 77.33%. Furthermore, the results showed that there was a positive and significant influence between disaster knowledge and students' alert attitude. Students' disaster knowledge and preparedness are actually improved through the implementation of the Disaster Alert School (SSB) program. Further research is also essential to explore other variables that may influence disaster preparedness, such as socioeconomic characteristics, characteristics of experience being made into disasters, demographic recommendations, in order for stakeholders to take policies related to natural disaster risk reduction.

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