

The Relationship between Disaster Experience and the Preparedness of High School Students in the Merapi Disaster-Prone Area

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Abstract

Purpose: This research aims to analyze the relationship between disaster experience on preparedness in the disaster-prone area of Merapi.

Methodology: The research technique applied in this research is quantitative research using a correlational design. The population used in this research was all 225 grade 11 students at SMA Negeri 1 Dukun. Sampling was done using the saturated sampling technique. The data collection technique used in this research used a questionnaire.

Results: The research results show that 1) The level of disaster experience at SMA Negeri 1 Dukun is in the high category with a percentage of 79% of 225 students and an average disaster experience score of 60. 2) The level of preparedness at SMA Negeri 1 Dukun is in the ready category with a percentage of 38% of 225 students with an average disaster preparedness score of 71.0. 3) The correlation test results obtained a correlation value of 0.320, which is included in the weak Pearson correlation level.

Applications/Originality/Value: This research can explain that there is a relationship between disaster experience and students' preparedness in facing the Merapi Volcano eruption disaster at SMA Negeri 1 Dukun.

Introduction

Indonesia is a country that crosses the equator. Besides that, Indonesia is also known as a country with high tourism potential because of its natural beauty. Indonesia's location between tectonic plates and in a volcanic area means that most of its territory has the potential for disasters (Arifin, 2016).

Disaster is a phenomenon or series of phenomena that occur due to natural or non-natural factors which can cause various losses of property, environmental damage, and loss of life and disrupt people's lives (Wulansari, 2017). Disasters are not a new natural phenomenon in Indonesia and are a phenomenon that has long been of public concern (Siti Hadiyati Nur Hafida, 2018). Natural disasters are difficult to avoid because not all of them can be easily predicted. One way that can be done to increase student preparedness is to include disaster material in school subjects. Education can strategically introduce potential disasters and their risks to students (Nuraeni et al., 2020). Risk education often referred to as disaster education is a process of building awareness that starts with knowledge, understanding, and action that can encourage preparedness, prevention, and recovery actions. The general aim of disaster education in schools is that students are expected to obtain an overview and references in disasters. Through disaster education, it is hoped that students can think and act responsively appropriately when facing a disaster (Desfandi, 2014).

One of the most common disasters encountered in Indonesia is volcanic eruptions. Volcanoes in Indonesia stretch from the island of Sumatra, along the islands of Java, Bali, and Nusa Tenggara to the eastern part of Maluku and turn to Sulawesi. If we describe the volcanoes in Indonesia as surrounding the Indonesian archipelago, then in Indonesia it is known as the Indonesian Ring of Fire or the Indonesian Tectonic Line (Perguruan et al., 2021).

Merapi Volcano is included in the ranks of volcanoes with high activity in the world, located on the border between the Province of D.I. Yogyakarta and Central Java. Merapi Volcano is a strato-type mountain with a lava dome that is \pm 2,911 meters high above sea level and \pm 30 km wide (Rahayu et al., 2014). Administratively, Merapi Volcano is located in 4 districts, including Magelang Regency (Central Java), Boyolali Regency (Central Java), Klaten Regency (Central Java), and Sleman Regency (D.I. Yogyakarta) (Syifa et al., 2014). Merapi Volcano has a characteristic eruption that begins with the formation of a lava dome which then experiences an avalanche accompanied by pyroclastic flows. Experts call this type of eruption the Merapi type and it is also called "Wedhus Gembel" by the people around Merapi. Large explosive eruptions were recorded in 1930, 1961, and 2010, and various characteristics of the eruption greatly influenced the distribution of material and its area of influence in the future (Murwanto et al., 2013). Merapi Volcano activity has been

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active again for the past three years. The intensive activity of Merapi Volcano requires residents around it to have a high level of preparedness, especially children, who are particularly vulnerable due to their lack of preparedness

The intensive activity of Merapi Volcano is also quite traumatic for children's psychology. The trauma experienced by victims of natural disasters cannot be underestimated and allowed to drag on so that disaster victims can still live their lives. Disaster victims will experience many changes or impacts. Disaster victims will experience repeated memories of the disaster which in the future will continue to develop into emotional loss, insomnia, and excessive alertness (Rahman, 2018). Therefore, student readiness must be improved. Disasters cannot be avoided, but as intelligent creatures, we can minimize the impact they cause. Disaster preparedness aims to improve rescue capabilities when a disaster occurs through simulations and education on disaster understanding. This activity aims to reduce vulnerability and damage to buildings and increase individual and community control over disasters that occur. Preparedness enables governments and someone to overcome disaster situations quickly and appropriately.

One of the schools that is always affected by the activities of Merapi Volcano is SMA Negeri 1 Dukun. SMA Negeri 1 Dukun is a school located in Dukun District, Magelang Regency, Central Java. The location of SMA Negeri 1 Dukun is included in the KRB II area. The KRB II area on the KRB Merapi map is marked in pink. The KRB II area is an area that has several potential dangers, such as being affected by hot clouds, stone throwing, landslides, and heavy ashfall, and can also be affected by lava flows.

Based on the description above, the relevant researchers conducted research with the title "The relationship between disaster experience and the preparedness of high school students in the Merapi disaster-prone area".

Method

The research technique employed quantitative research using a correlational design. There are several variables examined in this research, namely disaster experience, student preparedness, and the relationship between disaster experience on student preparedness at SMA Negeri 1 Dukun, Magelang Regency, which is a disaster-prone area in Magelang Regency. The population used in this research was all 225 grade 11 students at SMA Negeri 1 Dukun. Respondents in this study were determined using a saturated sample, ensuring that all members of the population would participate. The questionnaire used in this research contained several questions to be filled in by respondents, serving as the primary data collection tool (Table 1). The level of disaster experience is divided into 4 categories, these categories can be seen in Table 2.

The data analysis technique used in this research uses descriptive statistics and inferential statistics in processing data on levels of disaster experience and levels of preparedness using descriptive statistical techniques. Meanwhile, inferential statistical techniques in this research were used to analyze the relationship between the level of disaster experience and the level of student preparedness.

Table 1. Questionnaire Indicator Table

Variabel	Indikator	No Item
Disaster Experience	1. Experience directly and indirectly.	1,2,3,4,5,6,7,8,9,10
	2. Types and actions during the eruption of Merapi Volcano	11,12,13
	3. 3. Damage and losses arising	14,15,16,17,18,19
	4. 4. Disaster severity	21,22,23,24,25
Disaster Preparedness	1. Knowledge about disasters	26,27,28,29,30,31,32,33
	2. Emergency response plan	34,35,36,37,38,39,40,41,42
	3. Disaster warning system	43,44,45,46,47
	4. Resource Mobility	48,49,50,51,52

Table 2. Disaster Experience Level

No	Category	Mark
1	Very High	65 - 80
2	Height	49 - 65
3	Low	35 - 48
4	Very Low	>40

Source: Researcher, 2023

Disaster preparedness levels are grouped into 5 categories:

Table 3. Disaster Preparedness Level

No	Category	Mark
1	Very High	80-100
2	High	65-79
3	Medium	55-64
4	Low	40-54
5	Very Low	<40

Source: LIPI-UNESCO/ISDR, 2006

Results

Level of Disaster Experience Due to the Eruption of Merapi Volcano at SMA Negeri 1 Dukun, Magelang Regency

According to the results of research that the author has carried out regarding the level of experience of the Merapi Volcano eruption disaster at SMAN 1 Dukun, can be seen in Table 4 below.

Table 4. Statistical Analysis of Disaster Experience Value Distribution

Max Score	Min Score	Mean	Std. Deviation	Number of Samples
72	46	60	5,5	225

Based on the statistical analysis of the distribution of disaster experience scores for SMA Negeri 1 Dukun students have an average score of 60, a maximum score is 72, a minimum score is 46 and a standard deviation is 5.5 for the disaster experience score with a sample size of 225 students.

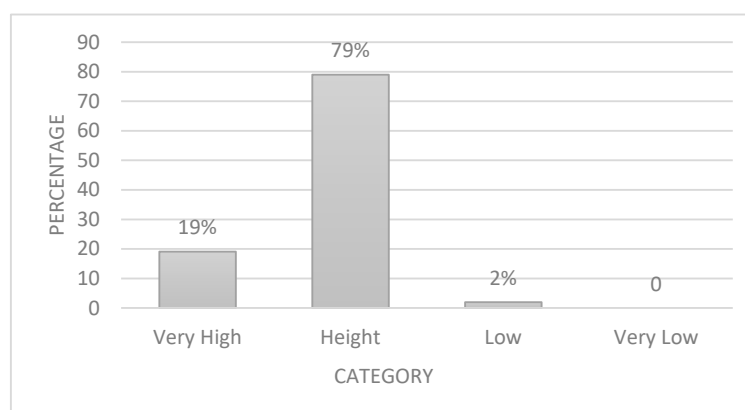


Figure 1. Disaster Experience Level Diagram

Based on Figure 1, can be known the level of disaster experience at SMA Negeri 1 Dukun. There are 19% of 225 students in the very high category. There are 79% of 225 students in the high category. And there are 2% of students out of 225 students in the low category.

Students' Level of Preparedness Facing the Eruption of Merapi Volcano at SMA Negeri 1 Dukun, Magelang Regency

After the researchers carried out data analysis regarding the level of experience of the Mount Merapi eruption disaster at SMAN 1 Dukun, which can be seen in Table 5.

Table 5. Statistical Analysis of the Distribution of Disaster Preparedness Scores

Max Score	Min Score	Mean	Std. Deviation	Number of Samples
26	7	71	13,8	225

Based on the statistical analysis of the distribution of disaster preparedness scores for SMA Negeri 1 Dukun students have an average score of 71, a maximum score is 26, a minimum score is 7 and a standard deviation of the disaster experience score is 13.8 with a sample size of 225 students.

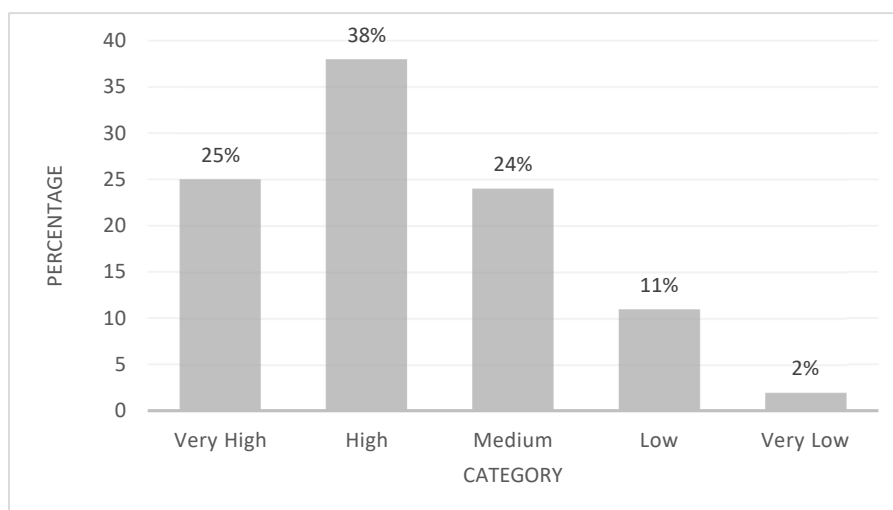


Figure 2. Diagram of Student Preparedness Levels for Disasters

Based on Figure 2, it can be seen the level of preparedness of SMA Negeri 1 Dukun students towards the Merapi Volcano eruption disaster. There are 25% of 225 students whose level of preparedness to face the eruption of Merapi Volcano is in the very high category. There are 38% of 225 students whose level of preparedness to face the Merapi Volcano eruption disaster is in the medium category. There are 24% of 225 students whose level of preparedness to face the Merapi Volcano eruption disaster is in the high category. There are 11% of 225 students who have a low level of readiness. And there are 2% of 225 students whose level of preparedness for the Merapi Volcano eruption disaster is in the very low category.

The Relationship Between Disaster Experience and Students' Preparedness in Facing the Merapi Volcano Eruption Disaster at SMA Negeri 1 Duku

Normality Test

The Normality Test is a test carried out to assess whether the data distribution of a group or variable is normal or not (Nuryadi et al., 2017). Normality Test can be said to have a normal distribution if the significance value is >0.05 and it can be said to be normal if the significance value is <0.05 . In Table 6 the normality test uses the Kolmogorof Smirnov method. If the significance value is more than >0.05 then the residual value is normally distributed. The normality test that was carried out showed a significance value of 0.971, which means the data is normally distributed.

Table 6. Normality test

One-Sample Kolmogorov-Smirnov Test		Unstandardized Residual
N		225
Normal Parameters ^{a,b}	Mean	.0000000
	Std. Deviation	3.65158033
Most Extreme Differences	Absolute	.033
	Positive	.028
	Negative	-.033
Kolmogorov-Smirnov Z		.489
Asymp. Sig. (2-tailed)		.971

Homogeneity Test

The homogeneity test for students' level of experience and readiness can be seen in Table 7. Data can be interpreted as homogeneous if the value is significant >0.05 and data is said to be inhomogeneous if the significance value is <0.05 . Based on the results of the homogeneity test carried out by the researcher, a significance value of 0.905 was obtained, which means >0.05 , which means the level of knowledge and preparedness is homogeneous.

Table 7. Homogeneity Test

Test of Homogeneity of Variances			
Levene Statistic	df1	df2	Sig.
.557	15	206	.905

Pearson Correlation Test

The person correlation test has several conditions that must be carried out, namely the normality test and homogeneity test. The normality test means that the data is not normally distributed. The homogeneity test means that the data is homogeneous so it can be tested using parametric statistics using Pearson correlation.

The correlation test results of community experience of disasters with preparedness in Table 8 show a significance value of $0.00 < 0.05$ with a correlation value of 0.320. So be seen that disaster experience there is a relationship with disaster preparedness in the weak correlation category.

Table 8. Pearson Correlation Test

Correlations			
		Pengalaman_Bencana	Kesiapsiagaan_Bencana
Pengalaman_Bencana	Pearson Correlation	1	.320**
	Sig. (2-tailed)		.000
	N	225	225
Kesiapsiagaan_Bencana	Pearson Correlation	.320**	1
	Sig. (2-tailed)	.000	
	N	225	225

Table 9. Correlation Coefficient Index Table

No	Category	Marks
1	No Correlation	0,00-0,19
2	Weak Correlation	0,20-0,39
3	Medium Correlation	0,40-0,59
4	Strong Correlation	0,60-0,79
5	Perfect Correlation	0,80-1,00

Source: (Sugiyono, 2013)

Discussion

Level of Disaster Experience Due to the Eruption of Merapi Volcano at SMA Negeri 1 Dukun, Magelang Regency

A disaster experience is an event that occurs and is experienced or felt by someone. Experience will influence a person's knowledge of the objects they experience and will shape learning about the events they experience if they happen repeatedly in the future (Huriah & Farida, 2010). After conducting data analysis, it was found that the level of disaster experience among SMA Negeri 1 Dukun students, regarding the eruption of Merapi Volcano, is in the high category, with a percentage of 79%. This high figure explains that the disaster experience experienced by students was very good. This is in line with research conducted Havwina et al. (2017) which states that people who have experienced disasters in the past tend to be better prepared to face disasters in the future because they already know and understand what they should and should do. Apart from that, the community will also know most of the disasters they have experienced and the signals that a disaster will come. Kalpan and Muhammad stated that past experiences encourage a person to understand the hidden dangers of disasters and will encourage a person to save themselves from hidden dangers (Efriansyah, 2021).

Several factors influence a person's level of experience, one of which is a person's curiosity in seeking information about the events they experience. Herdwiyanti and Sudaryono stated that a person's direct experience of a disaster can encourage him to seek information related to the disaster (Herdwiyanti, 2013). Based on this experience, a person will be better prepared to face disasters, this will also influence a person's preparedness.

Students' Level of Preparedness Facing the Eruption of Merapi Volcano at SMA Negeri 1 Dukun, Magelang Regency

After analyzing the data, the level of students' readiness at SMA N 1 Dukun, Magelang Regency, is classified as high, with a percentage of 38%, and very high, with a percentage of 25%. This finding is in line with previous research conducted by Pamungkasih & Atun (2020), who argue that the level of student readiness in the Merapi Volcano area must be above 50%. The high level of student preparedness at SMA N 1 Dukun is also based on several driving factors such as actively carrying out volcanic disaster simulations at school at least once every 2 months, "At SMA N 1 Dukun we actively carry out disaster simulations. ", especially volcanic eruptions, considering that the school is located in a disaster-prone area (KRB II)" (Informant 1). Apart from that, the high level of preparedness is also influenced by good and sufficient knowledge about preparedness so that it will form good behavior and attitudes about preparedness (Adiwijaya, 2017).

The Relationship Between Disaster Experience and Students' Preparedness in Facing the Merapi Volcano Eruption Disaster at SMA Negeri 1 Dukun

From the results of the Pearson correlation test, it can be seen that there is a relationship between disaster experience and students' preparedness in facing the eruption of Merapi Volcano at SMA Negeri 1 Dukun. This is indicated by a significance value of $0.00 < 0.05$ with a correlation result of 0.320, which is included in the weak category when seen through the correlation coefficient interpretation table. From these results, the two variables between experience and readiness have a relationship. The higher the experience value, the greater the level of disaster preparedness. According to research conducted by Havwina et al. (2017), the experience of disasters, both direct and indirect, is stated as one of the factors influencing a person's level of preparedness. The results of this research are also the same as research conducted by Fitriani and Selvyana (2021) who believe that there is a relationship between disaster experience and students' disaster preparedness. This is further strengthened by research conducted by Setyaningrum and Rumagutawan (2018) who think that disaster knowledge, preparedness, and experience are interrelated and related to each other, a good level of knowledge and experience is based on high disaster experience factors. Therefore, experience and readiness cannot be separated because they are interconnected and influence each other.

Conclusion

According to the results of the research carried out, the conclusion that the level of experience of the Merapi Volcano eruption disaster at SMA Negeri 1 Dukun is in the high category with a percentage of 79% with an average value of 60. Meanwhile, the level of disaster preparedness for the eruption of Merapi Volcano at SMA Negeri 1 Shaman is also in the ready category with a percentage of 38% with an average score of 71.0. This high level of preparedness is influenced by several factors, one of which is the level of disaster experience. Furthermore, a significance value of $0.00 < 0.05$ indicates a relationship between disaster experience and preparedness, the correlation test value of $0.320 > 0.05$ is included in the weak category.

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