KNOWLEDGE AND PREPAREDNESS IN FACING UP MERAPI MOUNTAIN ERUPTION IN YOGYAKARTA

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Abstract

In Indonesia, especially in Yogyakarta Special Region, most of the areas are strongly influenced by active volcanoes, which still occasionally erupt. Knowledge about volcanic eruptions is essential for the residents, because it would relate with residents' preparedness in a time of volcanic eruption. If the residents' knowledge and preparedness is good, it would prevent so many casualties. The aim of this study to determine about knowledge and preparedness in facing up Merapi Mountain eruption in Yogyakarta This was a quantitative observational research used a cross sectional approach. The research samples were 95 who lived in Gondanglegi, Wedomartani, Yogyakarta. They were selected using an accidental sampling technique. A bivariate analysis was conducted using Somers' D test. The majority of residents were males (39 respondents or 41.1%). Most of the respondents were between 46-55 years old (41 respondents or 43.2%). Most of the respondents had good knowledge (70 respondents or 73.7%). Most of the respondents have sufficient preparedness (63 respondents or 66.3%). Results of the bivariate analysis on the correlation between knowledge with preparedness facing up Merapi Mountain eruption in Yogyakarta showed a p-value = 0.001 ($p<0.05$). Bivariate analyzed between age and gender with knowledge and preparedness are p-value 0.491 and 0.854. Bivariate analyzed between level of education with knowledge and preparedness are p-value 0.020 and 0.017. There were no relationship between age and gender with knowledge and preparedness.There was a relationship between level of education with knowledge and preparedness. There was a correlation between knowledge level and preparedness facing up Merapi Mountain eruption in Yogyakarta.

1. INTRODUCTION

Indonesia is located at the encounter of the world plate namely Eurisia, Indo-Australia and the Philippines, the Pacific Ocean, causes Indonesia become a country with high level of vulnerability to natural disasters, one of the disaster is volcanic eruptions. One of the active volcanoes in Indonesia that often erupts is Mount Merapi. Mount Merapi is the most active volcano in the world that has an altitude of 2,968 m above sea level or equal to 9,737 feet. The area around Mount Merapi is Sleman Regency, DIY Province, Magelang Regency, Boyolali Regency and Klaten Regency [1].

Recorded in 2010 the eruption of Mount Merapi resulted in 357 fatalities and 258 people injured. Eruption in 2010 was the biggest eruption of the previous year [2]. In 2018 the activity of Mount Merapi increased marked by successive phreatic eruptions and followed by seismicity, so that the status of Mount Merapi from level I (normal) to level II (alert), then from a 3 km radius emptied, there were recorded no casualties. One of the areas affected by ash is Cangkringan Subdistrict, Kecamatan Pakem, and Ngemplak District (Wedomartani) [3].

Volcanic eruptions are part of volcanic activity where the sediment of magma inside the earth is driven by gas that has high pressure [4,5]. Volcanic eruptions have the danger of causing heat clouds, rock throws, heavy ash rain, lava flows and poison gas, and cold lava [6]. Result of the catastrophic volcanic eruptions, which will certainly have a lot of negative impacts on both casualties and environmental impacts, it is very necessary to take mitigation measures which aim to reduce the number of casualties as well as material by mitigation. Mitigation is an effort to prevent or reduce the impact of a disaster, either through physical development or awareness and capacity building in the face of disasters which are carried out in a planned and comprehensive manner. [4,5]. Anticipating and reducing the impact of volcanic disasters, knowledge and preparedness from citizens is needed. Knowledge is the result of knowing and occurs after someone has sensed a certain object. While preparedness is a series of activities carried out to anticipate disasters through organizing and through appropriate and efficient steps [4,7].

The results of a preliminary study conducted on residents of Wedomartani Gondanglegi, showed that there were still people who have less knowledge and preparedness related to the eruption of Mount Merapi. Based on this, the researcher took the title "The Relationship between the Knowledge level and Preparedness in Facing the Eruption of Mount Merapi at the Residents of Gondanglegi, Wedomartani, Yogyakarta". This study aims to determine the relationship between the knowledge level and preparedness against the eruption of Mount Merapi in the residents of Gondanglegi, Wedomartani, Yogyakarta.

2. MATERIALS AND METHODS

This research was an observational analytic quantitative research with cross sectional research design (cross section). The study was conducted in Gondanglegi, Wedomartani, Sleman Yogayakarta on April 29th to May 7th, 2019 with 95 respondents. Respondents in this study were inclusion criteria, residents of Gondanglegi who were willing to be respondents, who could read and paint, aged 25 to 50 years, at least junior high school education, had been affected by the eruption of Mount Merapi. Exclusion criteria were residents while data collection was traveling uptown, and who have been used to test validity. Samples were taken by accidental sampling technique. Sampling technique with accidental sampling is part of non probability sampling, where the selection of samples is done by the way in which a person is sampled. The instrument in this study used a knowledge level questionnaire about the Mount Merapi disaster and a preparedness questionnaire to face the Mount Merapi disaster with data analysis using the Somers'd test.

3. RESULTS AND DISCUSSIONS

Table 1. Respondent Frequency Distribution based on Sex, Age, and Education in Gondanglegi, Wedomartani, Yogyakarta

Characteristics	f	%
Sex		
Male	56	58.9
Female	39	41.1
Total	**95**	**100.0**
Age		
Late teens (17-25 years)	2	2.1
Early adult (26-35 years)	15	15.8
Late adult (36-45 years)	37	38.9
Early elderly (46-55 years)	41	43.2
Total	**95**	**100.0**
Education		
Junior High School	16	16.8
Senior High School	41	43.2
Diploma	7	7.4
Bachelor	22	23.2
Magister	9	9.5
Total	**95**	**100.0**

Based on table 1, most of the respondents were male with 56 respondents (58.9%). The most age categories in the early elderly were 41 respondents (43.2%). The most recent education category was senior high school with 41 respondents (43.2%).

Table 2. Respondent Frequency Distribution based on Knowledge Level and in Gondanglegi, Wedomartani, Yogyakarta

Characteristic	f	%
Knowledge Level		
Less	3	3.2
Moderate	22	23.2
Good	70	73.7
Total	**95**	**100.0**
Preparedness		
Moderate	63	66.3
Good	32	33.7
Total	**95**	**100.0**

Based on table 2, most of the respondent's knowledge level in good knowledge with 70 respondents (73.7%). The most of the respondent's preparedness were moderate with 63 respondents (66.3%).

Table 3. Correlation between Age and Gender with Knowledge Level in Gondanglegi, Wedomartani, Yogyakarta

Characteristic	Knowledge Level								*P-value*
	Less		Moderate		Good		Total		
	f	%	f	%	f	%	F	%	
Age									
Late teens	0	0.0	1	50.0	1	50.0	2	100.0	**0.491**
Early adult	1	6.7	4	26.7	10	66.7	15	100.0	
Late adult	1	2.7	8	21.6	28	75.7	37	100.0	
Early elderly	1	2.4	9	22.0	31	75.6	41	100.0	
Total	3	3.2	22	23.2	70	75.6	95	100.0	
Gender									
Male	0	0.0	11	28.2	28	71.8	39	100.0	**0.854**
Female	3	5.4	11	19.6	42	75.0	56	100.0	
Total	3	3.2	22	23.2	70	73.7	95	100.0	

Based on table 3, from 41 respondents (100%) of the early elderly, the majority of the knowledge level in the good category with 31 respondents (75.6%). Whereas in the bivariate analysis *P*-value was 0.419, which means there was no relationship between age and the knowledge level about preparedness facing the eruption of Mount Merapi. From 56 respondents (100%) male, most of the knowledge level in the good category with 42 respondents (75.0%). Whereas in bivariate analysis, p value 0.854 was obtained, which means there was no relationship between sex and the knowledge level about preparedness facing the eruption of Mount Merapi.

Table 4. The Correlation of Age and Gender with Preparedness in Gondanglegi, Wedomartani, Yogyakarta

Characteristics	Preparedness						*P value*
	Moderate		Good		Total		
	f	%	f	%	F	%	
Age							
Late teens	2	100.0	0	0.0	2	100.0	**0.070**
Early adult	12	80.0	3	20.0	15	100.0	
Late adult	25	67.6	12	32.4	37	100.0	
Early elderly	24	58.5	17	41.5	41	100.0	
Total	63	66.3	70	73.7	95	100.0	
Gender							
Male	24	61.5	15	38.5	39	100.0	**0.414**
Female	39	69.6	17	30.4	56	100.0	
Total	63	66.3	32	33.7	95	100.0	

Based on table 4, from 41 respondents (100%) of the early elderly, most of the preparedness in the moderate category with 24 respondents (58.5%). While the bivariate analysis

obtained p value 0.070 which means there was no relationship between age and preparedness to face the eruption of Mount Merapi. From 56 respondents (100%) male, most of the preparedness in the moderate category with 39 respondents (69.6%). Whereas in bivariate analysis obtained p value 0.414, which means there was no relationship between sex and preparedness against the eruption of Mount Merapi

Table 5. Cross Tabulation of Education with Knowledge Level in Gondanglegi, Wedomartani, Yogyakarta

Education	Knowledge Level								*P value*
	Less		Moderate		Good		Total		
	f	%	f	%	f	%	F	%	
Junior High School	1	6.3	8	50.0	7	43.8	16	100.0	
Senior High School	2	4.9	7	17.1	32	78.0	41	100.0	
Diploma	0	0.0	2	28.6	5	71.4	7	100.0	**0.020**
Bachelor	0	0.0	3	13.6	19	86.4	22	100.0	
Magister	0	0.0	2	22.2	7	77.8	9	100.0	
Total	**3**	**3.2**	**22**	**23.2**	**70**	**73.7**	**95**	**100.0**	

Based on table 5, from 41 respondents (100%) of senior high school education, the majority of the knowledge level in the good category with 31 respondents (78.0%). Whereas the bivariate analysis obtained p value 0.020, which means there was relationship between the education and the knowledge level about preparedness facing the eruption of Mount Merapi.

Table 6. Cross Tabulation of Education with Preparedness in Gondanglegi, Wedomartani, Yogyakarta

Education	Preparedness						*P value*
	Moderate		Good		Total		
	f	%	f	%	F	%	
Junior High School	14	93.3	1	6.7	15	100.0	
Senior High School	28	66.7	14	33.3	42	100.0	
Diploma	4	50.0	4	50.0	8	100.0	
Bachelor	11	52.4	10	47.6	21	100.0	**0.017**
Magister	6	66.7	3	33.3	3	100.0	
Total	**63**	**66.3**	**32**	**33.7**	**95**	**100.0**	

` Based on table 6, from 42 respondents (100%) of senior high school education, most of the preparedness in the moderate category with 28 respondents (66.7%). Whereas in bivariate analysis p-value 0.017 was obtained, which means there was relationship between the education and preparedness against the eruption of Mount Merapi.

Table 7. Cross Tabulation of Knowledge Level with Preparedness in Gondanglegi, Wedomartani, Yogyakarta

Knowledge Level	Preparedness						*P value*	*r*
	Moderate		Good		Total			
	f	%	f	%	F	%		
Less	3	100.0	0	0.0	3	100.0		
Moderate	19	86.4	3	13.6	22	100.0	0.001	0,278
Good	41	58.6	29	41.4	70	100.0		
Total	63	66.3	32	33.7	95	100.0		

Based on table 7, from 70 respondents (100%) of the knowledge level was good, most preparedness in good category with 29 respondents (41.4%). Whereas in the bivariate analysis, p value 0.001 was obtained, which means there was relationship between the knowledge level and preparedness facing the eruption of Mount Merapi. The correlation value (r) was 0.278, which means the relationship between the knowledge level was moderate. Positive value, means that the knowledge level with preparedness has a direct relationship, which means better knowledge level was more the respondent's preparedness.

The results showed that the knowledge level of the respondents was in the good category with 70 respondents (73.7%), in moderate category with 22 respondents (23.2%), and less with 3 respondents (3.2%). In this study most of the respondents' knowledge levels were in the good category. The results showed that the majority of respondents already knew and understood about the eruption preparedness of Mount Merapi. Knowledge is the result obtained by a person after sensing a particular object, recalling something that has been experienced intentionally or unintentionally [7,8].

The results showed that the majority of respondents in the early adult (46-55 years) with 31 respondents (75.6%) had a good knowledge level. From the results of the analysis obtained p value 0.491, which means there was relationship between age and knowledge level. Theory states, this is accordance with the experienced by someone, the more a person ages, the more experience they have. Where knowledge is the result of observing something that includes recalling events that have been experienced [8]. This is accordance with previous research, there was no significant relationship between age and knowledge level, because there are physical factors that can hinder the learning process adults include hearing and hearing impairment so that it decreases at some time in the power of thinking and working [9].

The results showed, most of the respondents was male with 42 (75.0%), had a good knowledge level. From the analysis results obtained p value 0.854, which means there was no relationship between the sex with the knowledge level. This is accordance with previous research, where the results of the study show that sex has no relationship with the knowledge level. Sex differences may form different perceptions that affect different attitudes and knowledge between men and women [10].

The results showed that the majority of respondents were senior high school education with 32 respondents (78.0%), had a good knowledge level. From the results of the analysis obtained p-value 0.020, which means there was relationship between the education with the knowledge level. This is accordance with previous research, which showed education has a relationship with the knowledge level of citizens about natural disaster mitigation landslides. It was explained that, those

who have had higher level education have broader experience and insight, and will have an impact on one's cognitive [10].

The results of the research showed that most respondents had preparedness in moderate category with 63 respondents (66.3%), while respondents in good category were 32 respondents (33.7%). In this research, most of the respondents' preparedness in the moderate category, which means that citizens can be said to be prepared and unprepared in facing the eruption of Mount Merapi. Theory states, preparedness is a series of activities carried out to reduce the risk caused by a disaster through organizing and through appropriate and efficient steps[11].

The results showed, respondents with late adult (36-46 years), most had preparedness in moderate category with 25 respondents (67.6%). From the results of the analysis obtained p value 0.070, which means there was no relationship between age and preparedness against the eruption of Mount Merapi. This is in accordance with previous research that there was no relationship between age with fire preparedness on employees, this is due to individual factors that can shape employee preparedness, which is influenced by several factors, namely knowledge, availability of facilities and infrastructure, training and supervision.

The results showed that the majority of male respondents, had preparedness in moderate category with 39 respondents (69.6%). From the analysis results obtained p value 0.414, which means there was no relationship between sex and preparedness against the eruption of Mount Merapi. This is accordance with the previous researchers, which showed no relationship between sex with the work safety and health emergency preparedness efforts with data showing that the majority of female respondents were 33 respondents (64.7%) had good preparedness [12].

The results of the research showed that most of the senior high school education respondents had preparedness in good category with 28 respondents (66.7%). From the results of the analysis obtained p value 0.017, which means there was relationship between the education and preparedness. This is accordance with previous research that there was relationship between the education and family preparedness. Where people with high and secondary education tend to have and do preparedness higher than those with low education [13].

The results showed, respondents with a good knowledge level, had preparedness in good category with 29 respondents (41.4%), while 3 respondents (100%) with less knowledge, all (100%) had sufficient preparedness. With the results of the analysis of p value 0.001, which means there was relationship between the knowledge level and preparedness facing the eruption of Mount Merapi. On the results of the correlation analysis the correlation value (r) is 0.278, which means that the relationship between the knowledge level and preparedness is in a fairly strong category. Positive value (=) means that the knowledge level with preparedness has a unidirectional relationship, meaning that the better the knowledge level, the more preparedness. This is accordance with the previous research which shows, there was relationship between knowledge and preparedness efforts with a value of p-value 0.009. This is because the level of preparedness of a person can be shaped by how often the person gets knowledge or information about the promotion and preparedness. Where the knowledge level of the individual is getting better, the preparedness of the individual will be better prepared [14].

Theory states, there are several factors that affect preparedness, namely experience, where one's experience of disasters will affect one's attitudes and preparedness. The second factor is knowledge, where good knowledge will increase one's preparedness. The third is attitude, where caring attitudes will encourage someone to take preparedness actions [15].and finally, social support [(16)]. However, the results of the study also showed that respondents with a good knowledge

level had preparedness in moderate category with 41 respondents (58.6%) and 3 respondents (13.6%) with less knowledge, had preparedness in good category. This is because preparedness is not only influenced by knowledge, but also influenced by experience, attitudes, and social support. In this study, respondents with good knowledge level have preparedness in moderate category, can be caused by experience factors from respondents when Mount Merapi erupted, so this affects the preparedness of the respondents.

4. CONCLUSION

The results showed the knowledge level of the Gondanglegi society, Wedomartani, Sleman, Yogyakarta. Some respondents indicated that they were quite ready to face the eruption of Mount Merapi. There was no relationship between age and sex with the knowledge level and preparedness facing the eruption of Mount Merapi. There was a relationship between the education and the knowledge level and preparedness facing the eruption of Mount Merapi. There was a relationship between the knowledge level and preparedness in the eruption of Mount Merapi in Gondanglegi, Wedomartani, Sleman Yogyakarta.

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