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Knowledge, atttitude, and action of community in disaster preparedness at the slope of Semeru Mountain, Indonesia

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Abstract
Context: Communities whose level of understanding and knowledge of disasters are still low can influence community preparedness in the face of disasters from before the onset, during, and after a disaster. **Aims**: This study aims to analyze the behavior of people in disaster preparedness in Argosari Village, Senduro Sub–district, Lumajang Regency, Indonesia. **Settings and Design**: This research was conducted in Argosari village, Senduro sub–district Lumajang regency in April 2018. This study uses quantitative methods and observational with a cross sectional design. **Methods and Material**: The sampling technique was accidental sampling method of 40 respondents. The independent variables were knowledge and attitudes of the community while the dependent variable was community preparedness for disasters. **Statistical analysis used**: Data analysis was bivariate analysis using SPSS software. Indept interview was used in collecting qualitative data. **Results**: According this study, most of the respondent was in moderate and sufficient categories. There was a significant relationship between knowledge and attitudes towards the behavior of natural disaster alertness in Argosari village with a p–value of $0.010 < \alpha = 0.05$. Some of the residents, did not yet have sufficient knowledge about natural disaster alertness. Knowledge that is lacking in awareness of natural disasters is influenced by several factors, namely the level of education, employment and age. **Conclusions**: There was a relationship between the level of knowledge and attitudes about disasters against natural disasters in Argosari Village, Senduro District, Lumajang Regency, Indonesia.

Keywords: Awareness, behavior, readiness, relationship

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Introduction

Geographically, East Java is considered to have the potential for disasters such as floods, tsunamis, tornadoes, earthquakes, landslides and so on. Almost all regions in East Java are disaster–prone areas. The province is threatened by a tsunami from the Indian Ocean, threatened by eruptions from seven active volcanoes, and annual floods from two major rivers, namely Solo and Brantas. Amount seven volcano are active in East Java which at times increases its activities, namely Mount Kelud in Kediri, Arjuno–Welirang in Malang, Bromo in Probolinggo, Semeru in Lumajang, Ijen in Banyuwangi, Raung in Jember, and Mount Lamongan.

Based on data from the *Badan Penanggulangan Bencara Daerah* (Regional Disaster Management Agency) of East Java Province, Indonesia in 2016, it was explained that out of 2 384 disaster events in Indonesia 386 disasters occurred in East Java. Of the 386 incidents 98 % (379 incidents) were dominated by hydrometerological disasters in the form of landslides, floods and tornadoes. Meanwhile, Lumajang Regency is one of the districts that is at high risk of disasters such as volcanic eruptions, landslides and tornadoes which severely threaten the lives of the surrounding population. The mountains around Lumjang that are still active are Mount Lamongan, Mount Semeru and Mount Bromo. The eruption of the three mountains often afflicts the rural population in Lumajang Regency, the only Argosari village resident in Senduro sub–district[1].

Disaster events that occur directly or indirectly have become a major challenge for the Government of Indonesia and Indonesian citizens because they can disrupt the National Defense System and threaten the safety of the population. According to Law No. 3 of 2002 concerning National Defense, the National Defense System is a universal defense system that involves all citizens of a country, region, and other national resources, and is prepared early by the government and held in total, integrated, directed, and continue to uphold national sovereignty, territorial integrity and the safety of all nations from all threats. Thus closely related to the occurrence of disasters in Indonesia is one of the non–military threats that must be considered and dealt with appropriately. One important factor in disaster management is community preparedness [2] .

Knowledge is a key main factor in a community's preparedness. The experience of various disasters that occur provides a very meaningful lesson on the importance of knowledge about natural disasters that must be owned by each individual, especially in disaster–prone areas. Knowledge of disasters is useful to influence people's attitudes and concerns to be prepared and alert in anticipating disasters. People who live in areas where earthquakes often occur must have knowledge about disasters, so that the community can reduce disaster risk, make preparedness, and have the ability to deal with disasters, especially earthquakes. Efforts to increase knowledge about earthquake disasters are the natural basis for preparedness in facing the disaster. Knowledge of disasters can foster understanding, awareness, and increase

knowledge about disasters located in areas prone to natural disasters in the hope of creating natural disaster management in a systematic, integrated and coordinated manner. Understanding knowledge about disasters is important for the community to know about the occurrence of disasters in the area where they live.

Communities whose level of understanding and knowledge of disasters are still low can influence community preparedness in the face of disasters from before the onset of a disaster, during a disaster, and after a disaster. Preparedness is an activity that shows the level of effectiveness of the overall response to disasters. Community preparedness is part of disaster risk reduction. Knowledge of the symptoms of surrounding disasters is important in community preparedness. Attempts to anticipate the possibility of disasters in order to minimize casualties, loss of property and changes in the way of life of the community are prepared before disaster strikes [3].

Materials and Methods

This study uses quantitative methods. This type of research is observational with a cross sectional design. This research was conducted in Argosari village, Senduro sub–district Lumajang regency, Indonesia in April 2018. The sampling technique used was accidental sampling method with a sample of 40 respondents. The independent variable is knowledge and attitudes of the community while the dependent variable is community preparedness against disasters.

The collected data was carried out by checking or validating data, coding, recapitulation and tabulation, then carried out statistical analysis using SPSS version 15.0. The styatistic design used is: Univariate Analysis, used to describe the characteristics of the research subjects, expressed in the form of tables and narratives to find out the proportions of each. Bivariate analysis was used to determine the odds ratio of independent variables, namely knowledge and attitudes of the community with dependent variables (community preparedness against disasters) and individually using the chi square test. .

Statistic analysis

Data analysis was bivariate analysis using SPSS software. Indept interview was used in collecting qualitative data.

Result

Senduro Subdistrict has an area of 228.67 km^2, where Senduro District has an orbital distance of 17 km with a distance of 45 min from the Senduro Sub–District Office with the Lumajang District Government center with an altitude of 500 m to 700 m above sea level (asl) with 4 176 mm of rainfall every year, with regional boundaries as follows:

i. North Side: District Gucialit and district Probolinggo
ii. East side: Sub–district Sumbersuko and sub–district Sukodono
iii. South side: sub–district Pasrujambe
iv. West side: district Poor

Argosari Village consists of five hamlets, namely:

i. Argosari
ii. Will
iii. Shocks
iv. Peak
v. Pusung Duwur

The majority of the villagers in the area of Mount Bromo are Tenggerese and Hindu, except in the Gedok hamlet which has embraced Islam. Most of his livelihood is vegetable farming, some trade and civil servants.

Table 1. Frequency distribution of gender respondents

Gender	Frequency	(%)
Male	25	62.5
Female	15	37.5
Total	40	100

Source: Primary data processed

Table 2. Frequency distribution of respondents age

Age	Frequency	(%)
12 to 24	6	15 %
25 to 45	24	60 %
> 46	10	25 %
Total	40	100 %

Source: Primary data processed

Table 3. Frequency distribution of respondents education

Education	Frequency	(%)
No school	13	32.5 %
Elementary school	16	40 %
Junior high school	6	15 %
Senior high school	5	12.5 %
Total	40	100 %

Source: Primary data processed

Table 4. Frequency Distribution of Respondents Work

Work	Frequency	(%)
Teacher	1	2.5
Driver	1	2.5
Farmer	38	95
Total	40	100

Source: Primary data processed

From the table above, the number of respondents in this study were 40 respondents. The respondent's sex distribution consisted of 25 men (62.5 %) and 15 women (37.5 %). The age distribution of respondents consisted of 12 yr to 24 yr as many as six people (15 %), 25 yr to 45 yr as many as 24 people (60 %) and > 46 yr as many as 10 people (25 %). According to the education level of the respondents, consisted of no school as many as 13 people (32.5 %), elementary school as many as 16 people (40 %), junior high school as many as six people (15 %) and senior high school a number of five people (12.5 %). The distribution of work of the respondents consisted of one teacher (2.5 %), one driver (2.5 %) and 38 farmers (95 %).

For the purposes of analysis, the data on each variable is divided into three. If the knowledge score is 0 to 5, it is classified into poorer knowledge, if the score of 6 to10 is classified into moderate knowledge, if the score of 11 to 15 is grouped in good knowledge. For attitudes, if the score is 0 to 5, it is grouped in the unfavorable category, if the score of 6 to 10 is grouped into categories in sufficient categories, and if the scores of 11 to 15 are grouped in good categories.

Table 5. Distribution frequency based on variables

Knowledge	n	(%)
Poorer	4	10 %
Moderate	28	70 %
Good	8	20 %
Total	40	100 %
Attitudes	**n**	**(%)**
Unfavorable	0	0
Sufficient	26	65 %
Good	14	35 %
Total	40	100 %

Source: Primary data processed

Table 6. Relationship between knowledge and attitudes of the community towards disaster awareness in Argosari Village, Senduro District, Lumajang Regency.

Variable	Category						Total		*p*–value
	Less						N	%	
	n	%	n	%	n	%			
Knowledge	4	10 %	28	70 %	8	20 %	40	100 %	0.010
Attitudes	0	0 %	26	65 %	14	35 %	40	100 %	0.010

Source: Primary data processed

From the Table 6 it can be seen that there is a significant relationship between knowledge and attitudes towards the behavior of natural disaster alertness in Argosari village with a p–value of $0.010 < \alpha = 0.05$.

Discussion

The characteristics of respondents

Based on the survey results, it was found that respondents who had a teenage age category of 12 yr to 24 yr were six people (15 %), 25 yr to 45 yr were 24 people (60 %), and the remaining 10 people (25 %) were included in the elderly category. Based on Howard et al.[4] research showed when someone age gets older, will make them more prepared to face disaster. This is because someone with older age have experience about disaster preparedness and conduct disaster management[4]. The intensity of having that experience, will make someone becoming wary and ready to face with disaster[5]. Research from Gershin et al.[9] also showed that someone with experience of being affected by a disaster physically or mentally will make disaster preparedness[6]. Adults are believed to be disciplined in maintaining their health, and are willing to accept new knowledge through counseling conducted by local health workers and counseling from the public health center. One of the counseling related to *Desa Siaga* (Idle village) where the *Desa Siaga* prepared the residents of Argosari Village to be able to overcome the problems in Argosari Village, including preparedness to deal with natural disasters (volcanic dust, landslides, tornadoes), while the elderly[7]. Some statements supported by Thomas and Griffith that showed there is significant associantion between demographic characteristic like age, and gender with disaster preparedness[8].

Based on the results of research conducted by the respondent's education level, it was known that the most education was elementary school with 16 people (40 %), while not in school as many as 13 people (32.5 %), SMP as many as six people (15 %), and high school five people (12.5 %).Education was an important factor in influencing knowledge. A person's education influences the pattern of thinking in work. The higher the level of education someone will pay more attention to the problems of health and safety. Based on Cvetkovic's[9] research showed that there was disaster preparedness difference among educyion level. When someone with elementary school education level would choose to evacuate friends and neighbor althought have already know potential hazard disaster and what should to do,

meanwhile someone with higher education level will evacuate their self to plateau[9]. People with elementary school and junior high scholl education level generally have poor knowledge about disaster preparedness, and people with senior high school education level above have good knowledge althought cannot implement their knowledge[10].

The average population in Argosari Village was still low in education, so local health workers must form special groups whose members consist of people who were graduating from junior and senior high school. With the existence of special groups in the community *Karang Taruna* (Youth Organitation), religious groups, officers provided education through counseling which disseminated to all residents in Argosari Village. For example, in the event of a volcanic dust disaster, the special group formed immediately reported the incident to the public health center, and at that time the public health center followed up by distributing masks to residents in Argosari Village and opening posts to provide free treatment because many Argosari villagers were suffering from ARI (acute respiratory infection) due to inhaling volcanic dust in quite a long time. The community there is accustomed to the environmental situation in the area that has the potential for frequent natural disasters and a few who wanted to go to high school or even to college school to find new knowledge so that the knowledge held by respondents was still lacking.

Based on the results of job analysis, it was known that most of them were farmers, which were 48 people (95 %). While according to male sex 25 people (62.5 %) and the remaining 15 people (37.5 %). The work carried out by residents in Argosari village was farmers, and the work was not only done by men, but both men and women every day planted as major vegetable farmers (cabbage, carrots, potatoes, pre onions). The work of farmers made the people accustomed to do activities outside the home despite natural disasters. Based on Cvetkovic et al.[11] research showed that parent's occupation would affect children knowlwdge about disaster, while the parent's didn't work will making poor knowledge for the children. Argosari villagers were mostly reluctant to be evacuated to a safe place and did not want to stop doing routine activities, namely farming, because they were accustomed to experiencing disasters, and they also did not know the dangers if they did not avoid dangerous conditions during volcanic dust eruptions, landslides, angina pickaxe etc.

Relationship between knowledge and attitudes about disasters against disaster awareness

Based on the results of the study showed that there was a significant relationship between knowledge and attitudes of awareness of natural disasters. Based on the level of knowledge of the Argosari villagers, who were on average elementary school graduates and there were still some who did not go to school, it was clear that it would greatly affect how difficult they received input in the form of knowledge about health and preparedness to overcome problems when natural disasters occured in their villages. For example, there was assumption that disaster was predetermined destiny[12]. This happened because association between knowledge with disaster preparedness which forms mindset in a person[13]. But

there were certain groups who were aware of education and easily accepted positive input about awareness of natural disasters, this group choosed to have another place to live in a disaster–safe area, for example buying a house in Senduro village, the house was inhabited by their children who continue their education to junior high and high school, parents stayed in Argosari to make a living and once a week they lived in the village of Senduro accompanying their children and sending living expenses and tuition fees for their children, but when a disaster struck their village they left Argosari village and chose lived in Senduro village which safe from disasters.

Increasing disaster preparedness knowlege will affect to increase self efficacy and their preparedness to face disaster[14]. But on the contrary for those who were low educated and difficult to receive knowledge and appeals to leave their villages during natural disasters, they still stayed in their villages day and night and worked as usual because they though that disaster was natural situation which would end without leaving their beloved village.

Conclusion

Based on the results of research on the relationship between the level of knowledge and the attitudes of natural disasters in Argosari Village, Senduro Sub–district, Lumajang Regency, there was a relationship between the level of knowledge and attitudes about disasters against natural disasters in Argosari Village, Senduro District, Lumajang Regency. Some of the residents of Senduro Subdosari Village, Lumajang District, did not yet have sufficient knowledge about natural disaster alertness. Knowledge that was lacking in awareness of natural disasters was influenced by several factors, namely the level of education, employment and age.

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