

Students Perception Toward Their Preparedness for Volcanic Eruption Disaster

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Abstract. This research aimed to know what knowledge do students have and how do student perceive their preparedness for disaster risk reduction. This research was descriptive research. The sample were 90 first grade students of SMP N 2 Cangkringan, selected by purposive random sampling. The instruments were questionnaire of students' preparedness to volcanic eruption disaster. By the empirical validation, the instrument meet the fit validity and high reliability value. The results show that students perception toward their preparedness for volcanic eruption disaster, for the student's knowledge and attitude towards disaster risk they meet very good criteria with value of 3,28. Student's knowledge and attitude towards early warning system meet the criteria good with value of 3,08. The aspects of student's knowledge and attitude towards plans for disaster emergency meet value of 2,98 with the criteria good. Meanwhile, the aspects of student's knowledge and attitude towards resource mobilization meet value of 2,88 with criteria good. They still need many improvement because there are many indicators that meet low or very low, considering they are located in disaster prone areas that very close to the volcanoes, they should have very good disaster preparedness in all aspects.

Keywords. *students perception, preparedness, volcanic eruption disaster*

1. Introduction

Indonesian territory is located at the confluence of three world lithosphere plates, namely the Indo - Australia Plate, the Eurasia Plate or Southeast Asia, and the Pacific Plate. The meeting of the three lithospheric plates of the world caused Indonesia to be traversed by two world mountain routes, namely the Mediterranean and the Pacific [1]. Indonesian territory is located in the magma lane that called Pacific Ring of Fire. Therefore, Indonesia has many volcanoes. Indonesia with 129 active mountains (17% of mountains in the world) is one of the regions with the highest volcanic potential in the world [2].

Risks arising during volcanic eruptions in the form of lava eruptions, pyroclastic flows, toxic gases, and land damage due to the lunge of pyroclastic flows. Dangers arising after the eruption include environmental damage, air pollution, and lava flows. The danger of volcanic eruptions will threaten some elements around it. Elements at risk include residents, facilities, physical infrastructure such as roads, bridges, housing, and so on. Disaster risk will increases when the community does not have the ability to respond to the danger of the eruption, it happens due to lack of understanding of the volcano and its dangers [3].

One of the most active volcanoes in Indonesia is Mount Merapi. Mount Merapi with an altitude of 2968 meters above sea level is in the areas of Sleman Regency, Magelang Regency, Boyolali Regency, and Klaten Regency. Mount Merapi is the most active Strato type volcano in Indonesia. From 1672 to



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2010 there were more than 80 eruptions, with intervals between 1-18 years or an average of 4 years. The zones affected by the eruption of Merapi volcano in Sleman Regency are spread over four regions: Ngemplak District, Turi District, Pakem District, and Cangkringan District [4]. Most of the area around Mount Merapi is a residential area, but there is still a green area as a National Park and there are also several rivers that have upstream on Mount Merapi. Residents in the area around Mount Merapi work as farmers, sand miners, and perpetrators of lava tour attractions. The high risk of disaster should be directly proportional to the level of vigilance of the population, given the location of the volcano which is adjacent to the settlement. However, in reality, not all residents in the area around the volcano understand what to do if natural phenomena occur related to volcanic eruptions. This is indicated by when there is an increase in status, residents continue to carry out their activities as usual and tend to ignore natural signs that should be wary of.

Indonesia is a country with the fifth largest population in the world, but the knowledge and actions of Indonesian people have not been able to reflect the behavior of people who have high preparedness toward disaster risk [5]. Indonesian people have low performance of disaster management, the low attention and focus on disaster mitigation activities, and the still weak role of education in the introduction of disaster mitigation [6]. It is appropriate for the community to know the vulnerability of the disaster risk, so that the community can act as a subject in disaster risk reduction efforts. The importance of increasing understanding of disaster risk must be instilled in all components of society, including school-age children. For school-age children, education can be an effective means of learning disaster and its risks by including subject matter on natural disasters as mandatory lessons for every student, especially in schools in disaster risk areas [7].

Disaster risk reduction is about building student understanding regarding the causes, nature, and effects of a hazard. It also encourages students to hone their knowledge and skills, with a view to contributing proactively to disaster prevention and mitigation. Disaster learning at the school level must be packaged as attractive as possible and emphasize the activeness and involvement of students in the learning process. Learning must also emphasize how students can recognize potential disasters and reduce disaster risks. Approaches that must be taken in integrating disaster learning in the curriculum include textbooks used, project approaches, competency-based approaches, specific subjects that are developed centrally, symbiotic approaches between the educational environment and education as sustainable development, and approaches to certain events [8]. In accordance with the applicable curriculum in Indonesia, there are four core competencies which include spiritual attitude, social attitude, knowledge dimension, and skill dimension. By integrating disaster learning in the curriculum, it can form a spiritual attitude about the role of religion in understanding the causes of natural phenomena. In addition to spiritual attitudes, social attitudes such as caring, the importance of protecting the environment, discipline, and interaction with the surrounding environment will also be formed. Knowledge can also be formed due to various factors, such as the relationship between family, peers, school, and environmental influences. This can affect the formation of student knowledge. Student skills can be realized in disaster mitigation, both at the time of prevention, implementation, and after a disaster [7].

A successful disaster response depends on the availability of disaster preparedness at all levels, phases, and resources in particular. Every stakeholder must take effective actions in emergency situations and disaster, also in disaster risk reduction program. The success of disaster risk reduction programs requires the support of various parties, including the citizen and the student component. This is because the citizen is the first vulnerable group affected by the disaster. Students are an educated group, which is expected to be a pioneer to uphold a culture of alertness in the community. On the other hands, there are no documented study in Yogyakarta that explores the student perception and awareness toward volcano eruption disaster. So, this study is aimed to know what knowledge do students have about disaster management, what skills and perception do students have for disaster management, and how do student perceive their preparedness for disaster risk reduction.

2. Research method

This descriptive research was used to examine the student perception toward their preparedness for volcanic eruption disaster. This study was conducted in SMP N 2 Cangkringan. All student who were in their 1st residency year were recruited in this study. A convenience sample of 90 student chosen to participate in this study, this number reflects the available students. Data was collected through self – reported questionnaires. This questionnaires were distributed individually to each participant, accompanied by a cover letter that clarifies the purpose, producer and duties of the participant. The participants were instructed to submit the completed questionnaire after finish filling the questionnaires.

The questionnaires consisted of 20 items, all items were rated according on 4 point likert – type scale, ranging from strongly disagree (1) to strongly disagree (4). The instrument was firstly validated in terms of construct and content by 2 expert lecturers and 2 junior high school science teachers. After the validator is approved, the instrument is feasible, and an empirical test is carried out at the school. Empirical test results were analyzed using the Quest program to determine the reliability and validity of the instrument. The original questionnaires had fit mean and standard deviation.

Table 1. Overall fit questionnaire test

No	Stipulation Terms (Fit Item)	Mean	Standard Deviation	Statement
1	<i>Infit MNSQ</i>	1.00	0.24	<i>Fit</i>
2	<i>Outfit T</i>	0.1	0.8	<i>Fit</i>

The results of the analysis show that all questionnaires passed the empirical validation test. The results of the questionnaire reliability based on internal consistency are 0.58 while the reliability results based on the reliability of case estimate is 0.61. The amount of reliability from the results of this analysis is included in the high category. After the instrument is declared valid and has a high reliability value, the instrument is feasible to use in data collection.

After collecting data using a questionnaire, the data is then processed. The assessment data for each aspect and indicator of the assessment items are arranged in a table and then the average and standard deviation scores are calculated using Microsoft Excel. The average scores obtained are then classified according to the guidelines according to Widoyoko (2007) with the following level of categories:

Table 2. Preparedness rating category classification for positive items [9]

No	Average Interval Score	Category
1	$3.25 < x \leq 4.00$	<i>Very good</i>
2	$2.50 < x \leq 3.25$	<i>Good</i>
3	$1.75 < x \leq 2.50$	<i>Low</i>
4	$1.00 < x \leq 1.75$	<i>Very low</i>

When the questionnaire items used are positive items, the preparedness assessment category uses above sequences. However, when the items used are negative items, the preparedness assessment category use the reverse order, so, the higher the score, the less categories will be.

Table 3. Preparedness rating category classification for negative items [9]

No	Average Interval Score	Category
1	$3.25 < x \leq 4.00$	<i>Very low</i>
2	$2.50 < x \leq 3.25$	<i>Low</i>
3	$1.75 < x \leq 2.50$	<i>Good</i>
4	$1.00 < x \leq 1.75$	<i>Very good</i>

3. Results and Discussion

Based on the preparedness framework toward disaster that made by UNESCO, disaster preparedness is grouped into four parameters, such as knowledge and attitude, emergency planning, early warning systems, and resource mobilization. Knowledge measures basic knowledge about disasters, such as their characteristics and causes. Emergency planning aims to find out the actions that have been prepared in the face of natural disasters. Early warning system is an effort in preventing the occurrence of victims due to disaster with existing warning signs. While, resource mobilization is the potential and improvement of resources in the community through skills and other supporting factors as training and fund.

3.1 Student's Knowledge and Attitude Towards Disaster Risk

The first research question is about the student's knowledge and attitude towards disaster risk. There are three positive items and one negative item. Statement items can be seen in this following table:

Table 4. Student's knowledge and attitude towards disaster risk

No	Items	Mean	Std.	Category
1	I find out the types of items that must be provided to minimize the risk of a volcanic eruption	3,40	0,61	<i>Very good</i>
2	Disaster prepared bags containing basic needs and important documents do not need to be prepared before a volcanic eruption occurs*	2,78	0,95	<i>Low</i>
3	I know that Sleman Regency has a high risk of volcano eruption	3,34	0,69	<i>Very Good</i>
4	I remind my friends to always be aware of the volcano eruption disaster	3,63	0,55	<i>Very Good</i>

*) *Negative items*

Knowledge is a major factor and is the key to preparedness. Knowledge that must be possessed by individuals and households about natural events and disasters includes the type, source, magnitude, and location of the disaster. In addition, the physical vulnerability of residential buildings including the shape and foundation must also be understood. The knowledge possessed can usually influence the attitudes and concerns of the community to be ready and alert in anticipating disasters, especially for those who live in disaster prone areas. From the result above, known that 3 out of 4 items meet the criteria *very good*. While, the negative item meet the criteria of *low*. That might be caused by students' lack of understanding related to the statement given because it is related to the importance of preparing disaster prepared bags, so, it should be prepared before volcanic eruption occurs [10].

3.2 Student's Knowledge and Attitude Towards Early Warning System

The second research question is about the student's knowledge and attitude towards early warning system. There are three positive items and two negative items. Statement items can be seen in this following table:

Table 5. Student's knowledge and attitude towards early warning system

No	Items	Mean	Std.	Category
5	I pay attention to any information submitted by the teacher regarding preparedness actions taken at school	3,47	0,54	<i>Very good</i>
6	I don't need to heed the warning that a volcano eruption will occur*	3,41	0,73	<i>Very low</i>
7	I pay attention to every sign and stage of volcanic eruption	3,36	0,50	<i>Very Good</i>

No	Items	Mean	Std.	Category
8	I took part in a simulation and mitigation of the volcano eruption disaster held at home when invited by my friend*	1,96	0,81	<i>Good</i>
9	I follow the volcano eruption simulation and mitigation routinely	3,29	0,69	<i>Very Good</i>

*) *Negative items*

Early warning includes the delivery of timely and effective information through clear institutions so that individuals and households that are threatened by danger can take steps to avoid or reduce risks and prepare for effective emergency response efforts. This can include the availability of information sources for disaster warnings from both traditional and local sources and access to disaster warning information. From the items above, known that 3 items meet the criteria *very good*, 1 item meet the criteria of *good*, and 1 item meet the criteria *very low*. The item that meet the very low criteria is about the importance of heed the warning that a volcano eruption will occur. Students must pay attention to the warnings given by the relevant agencies and then pay attention to directions, whether the situation is still considered safe or must be done rescue and evacuation. The second item that meet very low criteria is about students participation at simulation and mitigation of the volcano eruption disaster held at home. They are very agree that they must join that kind of activity when they are invited by their friends, but, each student should have their own initiative to participate in the activity [12].

3.3 Student's Knowledge and Attitude Towards Plans for Disaster Emergency

The third research question is about the student's knowledge and attitude towards plans for disaster emergency. There are three positive items and two negative items. Statement items can be seen in this following table:

Table 6. Student's knowledge and attitude towards plans for disaster emergency

No	Items	Mean	Std.	Category
10	I don't feel the need to interfere in determining the evacuation route for the volcano eruption*	2,88	0,86	<i>Low</i>
11	I participated in determining the evacuation route to be used in the event of a volcanic eruption	3,01	0,97	<i>Good</i>
12	I do not need to help the rescue team (SAR Team) to take action first aid during a volcano eruption disaster*	2,79	0,88	<i>Low</i>
13	I was on duty as a rescue team (SAR Team) when a volcanic eruption occurred	3,19	0,78	<i>Good</i>
14	I will avoid disaster-prone areas in the event of a volcanic eruption	3,64	0,75	<i>Very good</i>
15	I feel no need to wear masks and other personal protective equipment in the event of a volcanic eruption*	3,49	0,71	<i>Very good</i>
16	I learned what to do when a volcano erupted because of a teacher's order*	1,86	0,70	<i>Good</i>

*) *Negative items*

The emergency response plan includes seven components including a family plan to respond to an emergency: A family rescue plan include every people's job description in case of an emergency, an evacuation plan includes the availability of a map, a place for family evacuation routes, a place for families to gather during a disaster, a relative / family / friends who provide temporary shelter in emergencies, first aid, rescue, safety and security, fulfillment of basic needs, equipment and equipment, important facilities that have access to disasters, as well as exercises and simulations or rehearsals. There

are 2 out of 7 items meet the criteria *very good*, 3 out of 7 items meet the criteria *good*, and 2 items meet the criteria *low*. Those who included in low criteria is about student's role in determining evacuation routes and student's willingness in help the rescue team during volcano eruption disaster. They still think that this is the responsibility of the government and related agencies, they forget that disaster risk reduction is an obligation of all parties [11].

3.4 Student's Knowledge and Attitude Towards Resource Mobilization

The last research question is about the student's knowledge and attitude towards resource mobilization. There are three positive items and one negative item. Statement items can be seen in this following table:

Table 7. Student's knowledge and attitude towards resource mobilization

No	Items	Mean	Std.	Category
17	I am willing if I am appointed as a Disaster Preparedness Team in a school	3,52	0,58	<i>Very good</i>
18	When there is a volcano eruption in the classroom, even though my teacher hasn't ordered me to leave the classroom, I will still run out of the classroom and save myself*	2,10	0,97	<i>Good</i>
19	When a volcanic eruption occurs, I will use an evacuation route map to get to a safe point	3,60	0,60	<i>Very good</i>
20	When disaster strikes, I will return to class after listening to my teacher's orders	2,33	0,91	<i>Low</i>

*) *Negative items*

Resource mobilization includes family members involved in disaster preparedness seminars, meetings or training, skills of family members related to disaster preparedness, savings related to disaster preparedness, and family agreements to conduct simulation exercises and monitor disaster preparedness bags in a manner regular. There are 2 out of 4 items meet the criteria *very good*, 1 item meet the criteria *good*, and one item meet the *low* criteria. The item that meet the low criteria is about student perception that said they must listen to their teacher, due to the eruption in classroom and evacuation command. In the items, said that student will still run out from classroom even their teacher don't instruct them to do so. Many of them agree with this statement, this might causes by student's perception that they still evacuate theirselves to the safe area. Students still think that they must prioritize individual interests and ignore teachers instruction. Whereas, evacuation should only be done if there is an order for evacuation. If the eruption is not large and the situation is felt safe then there is no need for evacuation. The teacher should declare the importance of evacuation under various circumstances, so, students have their role model in the case of evacuation, regarding that not all of eruption disaster cases need any evacuation.

4. Conclusion

Students, the community, and the government cannot prevent disasters, but they can help prevent the destruction. The consequences are by joining with other providers and health care agents, and being well prepared to respond unexpected volcanic eruption disaster. The findings of this study indicate that students in SMP N 2 Cangkringan have good knowledge towards their preparedness for volcanic eruption disaster. That might be because students in SMP N 2 Cangkringan mostly live in disaster prone areas, therefore students' preparedness to face disasters is instinctively formed. But, they still need a lot of improvement in certain aspect considering that there are still many aspects that meet *low* or *very low* criteria.

Disaster management activities constitute a unified activity that involves all components of the community and stakeholder through coordination from the local to the national level. Therefore, the concept of compulsory training has emerged as an alternative in the framework of disaster risk reduction through social engineering to increase the capacity of communities in disaster prone areas. The target of compulsory training is for all residents in disaster-prone areas. Given that this was the first study of SMP

N 2 Cangkringan students disaster knowledge, more research needs to be done, to validate these results as accurate reflection of perceived preparedness.

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