Senior High School Students’ Preparedness In Facing Earthquake Disaster

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Abstract. Earthquake was a disaster that could not be predicted. The threat of earthquake in Imogiri needs attention to reduce the risk because of the disaster impact. The socialization and disaster training are needed to increase the students’ preparedness at school. The purpose of the research was to know the students’ preparedness level in Senior High School 1 Imogiri in facing the earthquake disaster. This research was descriptive research using quantitative approach. The data collection techniques used in the research were interview, documentation and questionnaire, that was the instrument of students’ preparedness in facing earthquake disaster in Senior High School 1 Imogiri. The data analysis technique used in the research was descriptive analysis with quantitative approach using frequency table. The results of the research showed that: Senior High School 1 Imogiri students’ preparedness in facing earthquake disaster was in the Ready category with average score 44.8. The indicators in the Ready category were the knowledge about earthquake and the resource mobility, while the indicators in the Less Ready were the attitude toward the earthquake, early warning system and the actions when the earthquake occurred.

1. Introduction

Natural disaster is phenomena or events that cannot be avoided, their occurrence can increase from year to year. According to Law Number 24 of 2007 concerning disaster management, a disaster is an event or series of events that threatens and disrupts the life and livelihoods of the community caused by natural factors and/ or non-natural factors as well as human factors resulting human casualties, environment damage, losses property, and psychological impact. Disaster can also be defined as a crisis situation that is far beyond human capacity to save oneself, it means that a natural disaster will not be called a disaster if the impact or the loss is not felt by human.

Earthquake is events that release energy caused by a sudden shift in the movement of the earth’s interior (the earth’s crust). Earthquake can occur due to tectonic activity or plate movement, earth, fault activity and volcanic activity. Earthquake is disaster that cannot be predicted when and in terms of their names, so that if an earthquake occurs in an area of great strength, it often causes casualties and damage to infrastructure. Therefore, it is necessary to have knowledge and efforts to deal with the earthquake., as to reduce casualties and damage to facilities and infrastructure as a result of the earthquake disaster.
Geologically, Indonesia is located on three tectonic plates, it makes Indonesia has many volcanoes. These tectonic plates are the Indo-Australian plate, the Eurasian plate and the Pacific plate. Indonesia’s location which is on three tectonic plates makes Indonesia becomes a country prone to earthquakes, tsunamis and volcanic eruptions. This condition is a treat to natural disaster in Indonesia.

Java island is one of the islands in Indonesia, which is located on the meeting point of the Indo-Australian Plate and the Eurasian Plate, namely the Indo-Australian Plate that skins below the Eurasian Plate which creates a subduction zone. The meeting of the two plates produces earthquake vibrations with different strength intensities. In addition, with the subduction zone, Indonesia also has many volcanoes, especially along the island of Sumatera, Java and Nusa Tenggara. BNPB stated that the Special Region of Yogyakarta had experienced earthquakes with a magnitude of 5 in 1867, 1943, 1976 and 2006. Bantul Regency is one of the areas in the Special Region of Yogyakarta that also felt the impact of earthquake on May 27, 2006 at 05:53 WIB with a magnitude of 5.9 SR (Zukhrufuddin Thaha, 2007:67).

The earthquake on May 27, 2006 with a magnitude of 5.9 Richter Scale, killed 4,626 people and 19,202 people were injured. The most victims and the worst damage caused by the earthquake were in Bantul Regency which was the epicenter of the earthquake. In Bantul, 4,141 people died, 12,026 people were injured because of the earthquake. In Sleman Regency 232 people died and 3, 789 were injured. In Yogyakarta City, there were 204 people who died and 318 people were injured. 22 victims died in Kulon Progo Regency and 2, 678 people were injured, while in Gunung Kidul Regency, 81 victims died and 19.897 were injured (Akhmad Muktaf Haifani, 2008:290).

Earthquake also had an impact to the public facilities damage, such as schools, hospitals, markets, and other public facilities. Areas of the Special Region of Yogyakarta province that were affected by the earthquake on May 27, 2006 included Bantul Regency, Sleman Regency, Kulon Progo Regency, Yogyakarta City and Gunung Kidul Regency. The number of houses damaged or collapsed in the villages in the Special Region of Yogyakarta province because of the tectonic earthquake which could be obtained from the Yogyakarta Earthquake Data Center dated June 12, 2006 was 96,360 houses, 117.182 severely damaged, and 156,568 slightly damaged. The worst damage was found in Bantul Regency which was assumed to reach 45% of the total number of damaged houses (Akhmad Muktaf Haifani, 2008: 291). Details of house damage due to the earthquake on May 27, 2006 are as follows:

| District       | Destroyed | Severely Damaged | Slightly Damaged |
|----------------|-----------|------------------|------------------|
| Bantul         | 71.683    | 70.796           | 66.512           |
| Sleman         | 5.243     | 16.003           | 33.233           |
| Yogyakarta     | 7.161     | 14.535           | 21.192           |
| Kulon Progo    | 4.527     | 5.178            | 8.501            |
| Gunung Kidul   | 7.746     | 10.670           | 27.130           |
| Total          | 96.360    | 117.182          | 156.568          |

Source: Akhmad Muktaf Haifani, 2008: 291

Based on table 1, data of damaged house in Yogyakarta Province due to the earthquake on May 27, 2006 showed that Bantul Regency was the worst. There were 71,683 houses in the category of destroyed, 70.796 houses were severely damaged, while 66,512 houses were damage in the slightly category. The least damaged house was in Kulon Progo Regency. There was 4,527 houses that destroyed 5,178 houses were severely damage and 8,501 were slightly damaged. In Sleman Regency, there were 5,243 houses destroyed 16.0003 were severely damaged and 33.233 were slightly damaged.
Gunung Kidul Regency 7,746 houses destroyed 10,670 houses were severely damaged and 27,130 were slightly damaged. In Yogyakarta City, 7,161 houses were destroyed 14,535 houses were severely damaged and 21,192 houses that were slightly damaged. The areas that were severely damaged during the earthquake in May 2006 were the areas that were transferred by the Opak Fault. The areas included Piyungan District, Pleret District, Imogiri District and Pundong District. One area that was categorized having a high danger was Imogiri district. The impact of the earthquake on May 2006 was also felt in the Imogiri District. The damages were casualties, wounded victims and damaged facilities.

The damage of facilities or building will also have an impact on people’s lives. For example: the victim caused by broken building. Schools are one of the most dangerous places when an earthquake occurs. It is because the school is one of the vital buildings as a gathering place for many individuals, especially during school hours. School buildings are susceptible to the threat of earthquake with the impact of broken buildings and casualties. Senior High School 1 Imogiri is located on Imogiri Timur street number 14 Wukirsari Imogiri Bantul Yogyakarta. Seeing the location of the school, the existence of this school is in the area with high earthquake hazard. Imogiri subdistrict experienced an earthquake on May 27, 2006 had casualties and damaged infrastructure. It showed earthquake had a big impact. The impact of the earthquake could also disrupt learning activities at schools.

The threat of earthquake in SMA N 1 Imogiri which can occur anytime requires a response from the school both by teachers and students. This is done to obtain information regarding understanding of disasters, disaster concept, disaster insight, and disaster readiness. The information can be used to determine the efforts that can be done to reduce the risk of the earthquake. Therefore the teachers’ and students’ readiness is necessary to prevent casualties.

The efforts to reduce the impact of the natural disaster need the students’ readiness to face the earthquake. Disaster readiness is defined as actions aimed at improving the safety of life. Readiness includes actions designed to increase the ability to take emergency measures to protect property from damage and chaos caused by disasters, as well as the ability to be involved in restoration and early post-disaster recovery activities (LIPI UNeSCO, 2006).

Preparedness in facing earthquake can be in the form of increasing the ability to handle hazards by participating in training, understanding evacuation routes, taking steps to save oneself, and others. In addition, students’ understanding of earthquake disaster characteristics and disaster mitigation needs to be improved as an effort to reduce disaster risk. Increasing students’ understanding of earthquake disasters can be done through education and dissemination of disasters from schools, government and related institutions. It needs to be improved with the aim of increasing students’ knowledge about disaster management, especially earthquake disasters to reduce the impact of the disasters.

Building preparedness does not mean teaching students to resist earthquake in their area, but teaching students about the effort that can be made to prevent and anticipate the adverse effects of an earthquake that can occur any time. Preparedness at school is important, considering that schools are locations that have a high risk of casualties. Therefore, it is necessary to have information about the level of preparedness of students in facing disasters. It can be used to make efforts to reduce the impact of the earthquake.

Based on the background above, the researcher tried to know students’ understanding and preparedness level in facing disaster. Therefore, the researcher was interested in conducting the research with title “The Preparedness of Senior High School Students in Facing Earthquake Disaster”.

2. The Method of The Research
This research was a descriptive quantitative research using frequency tables to explain facts related to the preparedness of SMA N 1 Imogiri students in facing earthquakes. The population of this study was all 568 students. The number of sample was 221 samples, using Isaac & Michael formula with 5% error rate. The data collection techniques were questionnaire/close questionnaire, interview, and documentation. The data analysis technique used in this study was quantitative approach using non-statistical analysis and frequency tables.
3. Results and Discussion
Earthquake preparedness is a series of activities to anticipate disasters. Disaster preparedness has five factors. The indicators of preparedness include: knowledge of earthquake disaster, attitude towards earthquake disaster, types of emergency action, level of early preparedness, and level of resource mobility.

Based on the five indicators above, it can be seen that students’ preparedness in facing earthquakes. The total score obtained by the students was assumed into five categories, very ready, ready, quite ready, less ready, not ready. The results obtained from the five indicators were as follows:

3.1. Students’ knowledge of earthquake disaster
Students’ knowledge of earthquake disaster is related to knowledge of earthquake characteristics. In addition, knowledge also includes students’ understanding of the definition of disaster preparedness. The results of the research were as follows:

| Indicator                          | Yes | Doubt | No |
|------------------------------------|-----|-------|----|
|                                    | f   | %     | f   | %  | f   | %  |
| Sudden earthquake                  | 190 | 86    | 28  | 12.7| 3   | 1.3 |
| Preparedness definition            | 213 | 96.4  | 7   | 3.2 | 0   | 0   |
| Preparedness toward to earthquake  | 209 | 94.6  | 11  | 4.9 | 1   | 0.5 |

Based on table 2, students’ knowledge of earthquake characteristics was good. It was shown from the results of the study that 86% of respondents or 190 students know the characteristics of earthquake. The earthquake characteristics in question was an earthquake that came suddenly. Students who answered doubtfully were 28 students or 12% of the respondents. While students who do not know was 3 students or 1.3% of the respondents.

Knowledge indicator was also related to the understanding of preparedness. Students know that preparedness was an activity carried out to prepare themselves for disaster quickly and precisely. Students’ knowledge of disaster preparedness was very good. It was indicated by the number of students who knew a number of 213 students or 96.4% of the respondents. Students who answered doubtfully were 7 students or 3.2% of respondents, while students who did not know were 0% of respondents.

In addition, students understanding of the importance of earthquake preparedness was also very good. There were 209 students who answered yes, 11 students answered doubt, and 1 student answered no. It showed that 94.6% of respondents knew the importance of being prepared for an earthquake. The percentage of respondents who answered doubt was 4.9%, while the respondents who answer no were 0.5%.

3.2. Students’ attitude toward earthquake disaster
Attitude toward earthquake disaster was a response made by students to face earthquake. These attitudes included: providing first aid medicine, attitude when the earthquake occurs, knowledge before an earthquake occurs, and attitude after an earthquake happens. The results of the research were as follows:
Table 3. Students’ attitude toward earthquake disaster

| Indicator                      | Yes | Doubt | No  |
|-------------------------------|-----|-------|-----|
| Providing first aid medicine  | 18  | 71    | 132 |
| Stay calm and not panic       | 114 | 94    | 13  |
| Knowing evacuation route      | 21  | 75    | 125 |
| Provide evacuation route      | 159 | 48    | 14  |

Based on Table 3, students’ attitude in facing earthquake disaster were quite lacking. It was indicated by 132 students or 59.7% of the respondents who did not prepare first aid medicine (P3K) in their school bags. There were only 18 students who always brought first aid medicine or 8.2% of respondents. 71 students or 32.1% of respondents answered doubtfully. When an earthquake occurred, students tried to stay calm and not panic. There were 114 students or 51.6% of respondents who were calm and did not panic when there was an echo of the earth. 94 students answered doubt, while 13 students or 5.9% of respondents answered no. It meant that 5.9% of respondents still felt uneasy and panic when an earthquake occurred.

In addition, the attitude in facing the earthquake disaster was knowing the evacuation route and preparing the evacuation route signs. There were 125 students or 56.5% of respondents who did not know the evacuation route signs at school. 75 students answered doubtfully, and 21 students answered yes. The answers of these respondents indicated that the students had never known the existence of an evacuation route at SMA N 1 Imogiri. There was no sign of an evacuation route at SMA N 1 Imogiri at the time of the observation. It was also made clear from the statement of the principal of SMA N 1 Imogiri. He confirmed that at SMA N 1 Imogiri no evacuation route had been installed.

Even though there were no signs of an evacuation route installed at school, the attitude of students about the importance of the evacuation route was very good. Based on the Table 28, there were 159 students or 72% of respondents answered yes, 48 students or 21.7% of respondents answered doubtfully and 14 students or 6.3 of respondents answered no. It showed that 72% of respondents agreed that one of the actions to be prepared for disaster was to prepare an evacuation route.

3.3. Types of Emergency Response done by Students

Types of emergency response are actions that are taken when an earthquake occurs. These actions include actions during an earthquake and actions after an earthquake. The results obtained were as follows:

Table 4. Types of emergency response actions done by students

| Indicator                                      | Yes | Doubt | No  |
|-----------------------------------------------|-----|-------|-----|
| Go Out of the class when the earthquake occurs| 172 | 33    | 15  |
| Go to evacuation site                         | 114 | 94    | 13  |
| Refuge under the table                        | 21  | 75    | 125 |
| Preparing for the second earthquake            | 159 | 48    | 14  |
| Preparing tent                                 | 34  | 70    | 117 |
| Helping injured friends                       | 92  | 79    | 50  |
| Stock of first aid medicine in Health Care Unit| 201 | 16    | 4   |

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The actions done during the earthquake are effort to save oneself. Efforts to save yourself include rushing out of the classroom, refuge under the table, and gathering at the evacuation site. Based on the table 4, there were 172 students or 77% of respondent who chose to immediately leave the classroom when an earthquake occurs. 33 students or 15% of respondents answered doubtfully and 16 students or 7,2% of respondents answered no. Based on these data, students prefer to leave the classroom immediately when compared to refuge under the table. It was indicated by the very small percentage of respondents who chose to refuge under the table, 9,5%. There were 34% of respondents who answered doubtfully and 56,5% of respondents answered no.

Actions taken by the students during an earthquake were gathering at the evacuation site. There were 114 students or 51,6% of respondents chose to immediately gathered at the evacuation site, 94 students or 42,5% of respondents answered doubtfully and 13 students or 5,9% of the respondents answered no. The location of the evacuation points at SMA N 1 Imogiri is on the ceremony court, basketball court, and volleyball court.

Self-rescue measured after an earthquake included preparing for aftershock, setting up tents, and treating injured friends.159 students or 72% of respondents prepared themselves in case of aftershocks. However, 117 students or 53% of respondents chose not to help prepare the tents, 70 students or 31,7% answered doubtfully and 34 students or 41,7% answered yes. The preparedness of schools to handle victims when an earthquake occurred was good. It was shown by the presence of first aid medicine (P3K) at the Health Care Unit(UKS). UKS in SMA N 1 Imogiri has sufficient first aid kits.

3.4. Level of early warning preparedness

The level of early warning preparedness is an activity carried out to provide a warning about disaster. It was related to the disaster warning system in SMA N 1 Imogiri. The warning can be in the form of traditional warning tools, modern, or from related institutions. The data obtained were as follows:

| Indicator                     | Yes | Doubt | No |
|-------------------------------|-----|-------|----|
|                               | f   | %     | f  | %  | f  | %  |
| Warning by siren              | 65  | 29.4  | 86 | 38.9| 70 | 31.7|
| Warning by kentongan          | 52  | 23.5  | 90 | 40.7| 79 | 35.8|
| Warning from BPBD (Regional Disaster Management Agency) | 189 | 85.5 | 23 | 10.4| 9  | 4.1 |

Based on table 5, the existing of early warning system for earthquake came from information from the Regional Disaster Management Agency (BPBD). It was indicated by a number of 189 students who answered yes, 23 students answered doubtfully, and 9 students answered no. A percentage of 85,5% of respondents received an early warning against an earthquake from the BPBD. Early warnings in the form of sirens and kentongan were not used for earthquake warnings. However, sirens and bells were less used as a warning when an earthquake occurred. It was also conveyed by the principal of SMA N 1 Imogiri. He said that school has bells. However, the bell is used to tell the change of hours. According to the principal, when an earthquake occurred, students spontaneously left the classroom.

3.5. Level of Resource Mobility

The level of resource mobility was the level of awareness of human resources, both students and institutions as well. The availability of infrastructure and facilities related to disaster preparedness. Efforts to prepare students in facing disasters were by participating in scout activities or Youth Red
Cross (PMR) to improve their self-healing skills. In addition, the availability of transportation facilities also played a role in evacuation of victims. The data obtained were as follows:

**Table 6. The level of resource mobility**

| Indicator                                           | Yes | Doubt | No |
|-----------------------------------------------------|-----|-------|----|
| Exctracurricular Scout and Youth Red Cross          | 206 | 12    | 3  |
| Joining Youth Red Cross extracurricular             | 44  | 34    | 143|
| Joining scout extracurricular                       | 210 | 8     | 3  |
| Knowing how to set a tent                           | 156 | 58    | 7  |
| Students could make a sedan chair                   | 136 | 71    | 143|
| Indonesian Red Cross played a role in victims evacuation | 196 | 19    | 6  |

The level of human resource mobility was related to the participation of students in activities that supported their ability to save themselves. These activities were the Youth Red Cross (PMR) and scouts. Scouting and Youth Red Cross activities were already existed in SMA N 1 Imogiri as extracurricular activities. The participation of students in scout and Youth Red Cross had been good.

Based on the table above, there were 210 students or 95% of respondents who had participation in scout activity. It was because all students had to follow the program. The participation of students in Youth Red Cross extracurricular was 19.9% of respondents or 44 students. There were 64.7% students who did not take extracurricular activities or 143 students. It was because PMR is an option of the extracurricular, so not all of the students took it.

The participation of students in scout and PMR could increase students’ knowledge about how to make stretcher and tent. The table showed that there were 156 students or 70.6% of respondents who knew how to set up a tent. In addition, 136 students or 61.5% of respondents were able to make stretchers. The existence of these two extracurricular activities provided additional knowledge for the students, especially in action before it occurs, when it occurs and after it occurs.

### 3.6. Students’ of SMA N 1 Imogiri preparedness level in facing earthquake disaster

Students’ of SMA N 1 Imogiri preparedness level was the preparedness level in facing earthquake disaster quickly and precisely. Indicators of the preparedness level in this study was the students’ of SMA N 1 Imogiri knowledge in facing earthquake disaster, students participation in earthquake disaster education and training activities, and students’ preparedness in facing the earthquakes.

Based on those three indicators, it could be seen the level of students’ preparedness in facing earthquakes. The total score obtained by students from the three indicators was assumed to break into five categories. The categories of preparedness were very ready, ready, quite ready, less ready, and not ready. The results obtained from this study were as follows:

**Table 7. SMA N 1 Imogiri students’ preparedness level in facing the earthquake disaster**

| Category       | Frequency | %   |
|----------------|-----------|-----|
| Very Ready     | 1         | 0.5 |
| Ready          | 115       | 52  |
| Quite Ready    | 102       | 46.2|
| Less ready     | 3         | 1.3 |
| Not ready      | 0         | 0   |
Based on table 34, there were 0.5% of respondents in the Very Ready category, 52% of the respondents were in the Ready category, 46.2% of respondents were in the Quite Ready category, 1.3% of respondents were in the less ready category and 0% of respondent was included in the Not Ready category. This data showed that the level of preparedness level of SMA N 1 Imogiri Students in facing earthquake disaster was in the Ready category. The preparedness of SMA N 1 Imogiri students who were included in the Ready category reached 52% of respondents. The percentage of preparedness was influenced by the level of preparedness of students’ regarding knowledge about earthquake and students’ preparedness to face it. Most students’ knowledge about earthquake disaster was included in the Ready category, reached 105 students or 47.5% of respondents. Students who fall into the Very Ready category related to knowledge reached 102 students or 46.2% of respondents. In addition, this preparedness also related to the preparedness students to face the earthquake. Students’ preparedness to face the earthquake was included in the Ready category with percentage of 68.3%. There were still some of students in SMA N 1 Imogiri who were in the Quite Ready and Less Ready category. The percentage of students who were Quite Ready reached 46.2%, while the Less Ready category reached 1.3% of respondents. The existence of students who were still in the Quite Ready Less Ready category influenced by students’ participation in earthquake disaster counseling activities. The percentage of students’ preparedness in participating in disaster counseling reached 47.10%, including in the Quite Ready category.

4. Conclusion

Based in the result and discussion of the research which was done, it can be concluded that the preparedness level of SMA N 1 Imogiri students in facing the earthquake disaster is in the Ready category, with average score 44.8. The indicator of students’ knowledge about earthquake and resource mobility is in the Ready category, indicator of early warning is in the Less Ready category and attitude is in the not ready category.

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