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Level of Preparedness of Grade XII High School Students in Facing Disaster

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ABSTRACT
Most of the territories in Indonesia are very vulnerable to natural disasters so that attempts are needed to minimize the various threats posed. Preparedness is the safety key in facing the threat of disaster. This research aims to analyze the level of preparedness of high school grade XII students to face disasters at State Senior High School 2 Wangi-Wangi. This research used quantitative methods. Data were collected by distributing questionnaires to 46 respondents. Data analysis used descriptive statistical analysis techniques. The results showed that the level of preparedness of class XII students was in the ready category with a percentage of 74% and 26% in the not ready category. This indicates that the majority of students have awareness of disaster risks. However, the preparedness of vulnerable groups, especially children, must be improved. The roles of various parties are needed to optimize the preparedness of students to face disasters, both natural, non-natural, and social disasters.

Keywords: *Disaster preparedness, High school students*

1. INTRODUCTION

Indonesia is geologically located at the confluence of three tectonic plates, namely the Eurasian, Indo-Australian, and Pacific Plates. Indonesia is also in the ring of fire with many active volcanoes scattered on the islands of Sumatra, Java, Bali, Sulawesi, and islands in eastern Indonesia, except for the island of Kalimantan. Since the position of Indonesia is in the ring of fire, it leads Indonesia to be one of the countries that are very vulnerable to natural disasters, especially volcanic eruptions and earthquakes.

Various natural disasters have occurred in various countries worldwide, including Indonesia. These disasters are often a serious threat to humans that give a lot of losses. [1] categorizing the losses due to the direct and indirect disasters, namely casualties and injuries, losses in infrastructure, the problems of public health. Based on global data or the Emergency Events Database (EM-DAT) on the impact of the disaster in Indonesia from 1900 to 2016, it shows that volcanic eruptions are the third-largest disaster in Indonesia after floods and earthquakes are in the second-highest number of casualties [2]. The tsunami in Aceh in 2004 was one of the most devastating disasters in Indonesia which caused enormous material and non-material losses to human life.

Losses caused by disasters can be minimized by maximizing the implementation of the management before, during and after a disaster. Hyogo Framework for Action (HFA) (2005-2015) emphasizes five performance priorities for reducing disaster risk in the world, namely 1) ensure that disaster risk reduction is a nationwide and local priority with the institution as the basis for implementation; 2) identify, assess, monitor disaster risk and increase early warning; 3) use knowledge, innovation, and education to build a culture of safety and resilience at all levels; 4) reduce the underlying risk factors; 5) strengthen disaster preparedness at all levels [3]. The existence of The Hyogo Framework for Action aims to build the resilience of the nation and disaster community as well as a global implementation in disaster reduction [4]. The role of government and society is essential in the attempt to disaster reduction and management. Specifically, other issues must be concerned and needed to minimize the impact of natural disasters are knowledge, awareness, and community preparedness

in responding to disaster [5]. [6] it explains that training in disaster management can help to increase the comprehension and knowledge of society in dealing with disasters.

The impact of disasters on developing countries tends to be concentrated on the poor, marginalized groups, and less resilient sectors of the population [1]. The most vulnerable groups become a priority in an effort to reduce the vulnerability of disasters [7], [8]. Children, pregnant women, disabled people, and the elderly are the most vulnerable to disasters [9], [10], [11], [12]. This is due to their lack of knowledge and inability to act independently when a disaster occurs [13], [14]. The strategy that can be applied to anticipate disasters, especially for vulnerable groups, is the implementation of disaster education. Disaster education for vulnerable groups aims to provide knowledge, skill, and motivation to individuals and groups to take action and it aims to reduce their vulnerability to disasters [12].

Knowledge of disasters is an important basis for preparing individuals to face the threat of disasters, in particular the natural disasters. Children as a vulnerable group can be provided earlier about disaster knowledge and education, especially in the school environment. Education is considered as one of the various efforts to reduce disaster risk, this is undertaken by making the material of disaster as a compulsory lesson for students, especially in schools located in disaster-prone areas [15], [16]. It is expected that the implementation of disaster education programs in schools can improve the preparedness of students. Considering that the increasing number of disasters, those that have an impact on vulnerable groups, especially children, this research is very important and is believed to provide a new understanding in the scope of disaster studies. This study aims to analyze the level of preparedness of students to face natural disasters.

2. METHOD

This research was conducted at one of the senior high schools in Indonesia in July 2020. The type of research used was survey quantitative research. The populations in this research were all students of class XII, consisted of 86 students. Sampling used the Slovin Formula with a confidence level of 10%, so then it obtained samples of 46 respondents. The collection of data was carried out by giving questionnaires to respondents via Google Form. The questionnaire consisted of several indicators used from previous studies on preparedness such as knowledge, emergency response plan, early warning, and resource mobilization, where all questions in these parameters are assumed to have the same weight [17]. The data analysis used descriptive statistical analysis techniques with the help of the SPSS 23 statistical program. Index analysis was used to measure the level of students' preparedness to face natural disasters. The index value was calculated using the following formula [17]:

$$\text{Index} = \frac{\text{Total Parameter Real Score}}{\text{Maximum Score of Parameters}} \text{x} 100\% \quad (1)$$

Table 1. Preparedness level scale [18]

Category	Index Value (%)
Very ready	80- 100
Ready	65- 79
Almost ready	55- 64
Less ready	40- 54
Not ready	<40

3. RESULTS AND DISCUSSION

Preparedness is a series of activities carried out to anticipate disasters by organizing and taking appropriate and efficient measures. Disaster preparedness refers to the steps taken to prepare for, prevent and reduce the impact of a disaster, in particular on the vulnerable groups. This is significant considering that children (students) as one of the vulnerable groups need to be equipped with disaster preparedness. This research aims to find out the level of preparedness of high school of XII grade students in dealing with disasters, especially natural disasters. The complete level of student preparedness can be seen in the table 2, 3, 4, 5, 6.

3.1. Knowledge about Disaster

Knowledge was one of the main points from the concept of preparedness and could influence a person's attitude or behavior in anticipating disasters [19], [20], [21], [22]. [22] in his research revealed that someone who received information about a disaster, the individual tended to have a positive attitude compared to an individual who did not ever receive information. Knowledge of disasters was a significant element in preparing students to face disasters, especially natural disasters, therefore this knowledge should be given as early as possible [13].

Table 2. Students' knowledge on the disasters (N = 46)

No	Indicators	Index	x□ Index
1	Definition of disaster		0.825
	a. Natural disasters that interfere with human life	1	
	b. Human behavior that causes damage to nature	0.913	
	c. The unrest of social / politic	0.674	
	d. Traffic accident	0.761	
2	The cause of the earthquake		
	a. Shifting of tectonic plates	1	
	b. Volcanic eruption	0.957	
	c. Landslide	0.870	
	d. Tornado & Thunderstorms	0.652	
	e. Oil drilling	0.391	
3	Actions are taken during an earthquake at school		
	a. Take cover under a sturdy table while holding on to the table leg	0.652	
	b. Keep away from bookshelves/items and hanging objects	0.935	
	c. Keep away from window/glass wall	1	
	d. Leave the room regularly (not overcrowding)	0.935	
4	The cause of the tsunami		
	a. Earthquakes under the sea	0.957	
	b. Volcanic eruption under the sea	0.935	
	c. Landslide under the sea	0.848	
	d. Tornado	0.543	
5	Actions taken to improve the preparedness on the earthquake & tsunami		
	a. Increase knowledge about earthquake and tsunami	0.935	
	b. Store books and school equipment in a safe and accessible place	0.522	
	c. Participate in self-rescue exercise from earthquake and tsunami	0.978	
	d. Listen to information about an earthquake and tsunami from radio, TV, and other sources	1	
6	Resources about the disaster		
	a. School	0.913	
	b. Print media (newspapers, magazines, tabloids) and electronics (TV / Radio / internet)	0.957	
	c. Books, comics, posters, leaflets, bulletin boards, leaflets	0.565	
	d. Listen to information about the earthquake and tsunami from radio, TV and other media	1	
7	Gaining knowledge about:		
	a. Disaster warning	0.826	
	b. First aid	0.674	
	c. Rescue and evacuation	0.717	

The results of this research table 2 indicated that the majority of students understood the definition of disaster, including the causes of natural disasters such as earthquakes and tsunami. Besides, the data showed that some respondents could understand what actions must be taken as the effort of disaster preparedness. The high index (0,825) or percentage of (82.5%) regarding students' knowledge of disasters was influenced by the sources of information obtained by students. [23] in this research pointed out that the average value of the school community's knowledge of disasters was 61.41%, it indicated that the majority of respondents already had an understanding of the disasters. It was consistent with this, [24] argued that the high level of high school students' knowledge about disasters, especially earthquake, it was influenced by various sources of information (schools, television, Internet, and lectures) while resources such as family, radio, and video games did not affect. However, [25] demonstrated that video projections on disaster education in The Seattle School District (Nathan Hale High School) could build disaster resilience, increase social capacity, and motivate students. Thus, it could reduce the vulnerability of students. Knowledge of disasters through good practices and lessons learned were factors of success in disaster management [26].

3.2. Emergency Response Plan

As a result of the negative impacts caused by disasters, all levels of society, especially vulnerable groups, must be prepared for a disaster emergency. The results of this research table 3 indicated that the percentage of disaster emergency response plan, especially earthquake and tsunami, was 79% or index (0,79). These statistics indicated that the majority of respondents understood indicators regarding what preparations were made and what to do before or during a disaster, especially the earthquake and tsunami. These indicators were important in disaster response efforts.

Table 3. Emergency response plan toward disasters (N = 46)

No	Indicators	Index	x□ Index
1	Preparation before the earthquake and tsunami		0.79
	a. Joining a self-rescue exercise	0.957	
	b. Knowing safe place	1	
	c. Writing down important addresses or telephone numbers of family and relatives	0.826	
	d. Knowing the important places (hospital, fire department, police office, Indonesian Red Cross, PLN) e. Knowing the evacuation place of family members	0.913	
	f. Joining a self-rescue exercise	0.935	
2	Rescue the following items in the disaster of an earthquake and tsunami		
	a. Self	1	
	b. Report cards / diploma	0.717	
	c. Bags/pouches/boxes containing books and school supplies	0.500	
	d. Letters and other important items	0.739	
	e. Favorite items	0.522	
3	The following items are contained in the school		
	a. Evacuation / rescue maps and routes	0.609	
	b. Evacuation / rescue equipment and supplies	0.478	
	c. First aid kit and essential medicines	0.826	
	d. School Health Post (UKS)	1	
	e. Little doctor / Youth Red Cross (PMR)	0.826	

One of the disaster response efforts in schools was through training in self-rescue during a disaster. Disaster training was needed to minimize casualties or loss of property [27]. [28] argued that training and simulations as responsive measures for students could be applied in extracurricular activities or special local content in schools. [29] in his study on 11 grades of high school students in Banda Aceh, Indonesia explained that disaster response to students could be improved through the application of geographic literacy given by the teacher during the learning process in the classroom, especially in the material with the theme of disaster. In addition, the emergency response could be carried out by socializing emergency and disaster response, training evacuation, and simulations in dealing with emergencies situations, which when disaster response education can be implemented properly, students could carry out disaster response procedures such as doing first aid to accident victims and others [28]. The various actions and policies made were expected to contribute to community resilience and help reduce losses due to disasters, especially for the welfare of vulnerable groups in the future.

3.3. Disaster Warning

Various cases of natural disasters had caused losses for humans. Therefore, an early warning was very important for community preparedness and safety, especially coastal communities. In line with this [30], [31] argued that the main component of disaster risk reduction was through the implementation of early warning. The results of this study table 4 showed that almost all respondents understood what actions could be taken when they heard the warning signs of a tsunami disaster. However, this was not comparable with the respondents' answers regarding the existence of a tsunami warning system in this area.

Table 4. Disaster warning (N = 46)

No	Indicators	Index	x□ Index
1	Tsunami warning signs in the area		0.748
	a. Traditional / local agreement (traditional alarm, bell, drum, etc.)	0.413	
	b. National tsunami warning system (siren)	0.391	
2	Actions are taken when hearing signs of tsunami hazard		
	a. Move away from the beach and/or run to high places	1	
	b. Go to the evacuation place Immediately	0.957	
	c. Calm down / don't panic	0.978	

The Indonesian government had made efforts to increase the level of community preparedness in terms of tsunami preparedness. This was proven by the existence of various tsunami preparedness activities in several coastal areas in Indonesia (evaluation training activities, awareness-raising activities, and socialization of disaster warning systems at the local level) [32]. Not only that, [33] stated that all areas in Indonesia were covered by the Indonesia Tsunami Early Warning System (InaTEWS). [33] also stated that when Indonesia's territory was threatened by a tsunami, InaTEWS would send a tsunami early warning to the people living in that area. Early Warning System was one of the important elements in disaster risk management [34]. [35] explained that when the Early Warning System was implemented effectively, it could increase the country's development resilience against natural disasters and prevent casualties.

Specifically, efforts to increase preparedness in schools could be carried out with various programs. [36] argued that one of the school community preparedness efforts was carried out through the socialization of early warning mechanisms to the school community. However, [37], [38] argued that besides to striving to improve the readiness of school communities, school-based disaster preparedness programs also seek to develop knowledge for the creation of a culture of resilience in the entire school community.

3.4. Resource Mobilization

Disaster preparedness efforts could be made through increased resource mobilization (training, socialization, and activities related to disaster management efforts). First, regarding socialization. [39] in his research said that training on disasters

should be provided to the school community at least once a year. Second, regarding socialization. A model of disaster preparedness socialization was needed as an effort to prepare students for disasters as stated in the study [40]. [40] also argued that in this era of digitalization it could be easier for us to obtain information, so that dissemination of disasters could be carried out through social media.

Table 5. Resource mobilization capabilities (N = 46)

No	Indicators	Index	x̄ Index
1	Get counseling		0.596
	a. Precautions and actions to take before, during, and after an earthquake	0.739	
	b. Precautions and actions to take before, during, and after a tsunami	0.804	
	c. Soil / landslide movement and actions before and during landslides	0.587	
	d. Volcano and actions that must be taken before and during a volcanic eruption	0.565	
2	Participating in activities / exercises / meetings		
	a. First aid kit includes a little doctor, PMR	0.391	
	b. Scouting (rigging, putting up tents and making stretchers)	0.630	
	c. Evacuation drills and simulations	0.457	

The results of this research table 5 indicated that index of the ability to mobilize resources was 0,596 or 59.6%. Counseling, activities or training regarding disasters which given to students had not been optimally given, causing insignificant statistical numbers on this indicator. The implementation of this should be more optimized by the school. [36] argued that training and outreach were part of the school community preparedness. Therefore, socialization, training and disaster risk reduction activities such as disaster mitigation socialization were urgently needed from an early age. Disaster mitigation education provided early on could make people more prepared and alert in dealing with disasters [41]. Various indicators of preparedness had been described. More details, the level of preparedness is presented in table 6.

Table 6. Preparedness level scale

Indicators	Index	Percentage (%)	x̄	Category
An Understanding About Disasters	0.825	82.5	74%	Ready
Disaster Response Plans	0.790	79		
Disaster Alert	0.748	74.8		
Resource Mobilization	0.596	59.6		

Table 6 showed that the students' preparedness levels were in the ready category. This indicated that the majority of students were aware of disaster risks, especially earthquakes and tsunamis. However, the preparedness of vulnerable groups, especially children, must be improved. Efforts to develop sustainable preparedness strategies could be made through the integration of schools and other entities. One example that could be done was cooperation between schools and the Regional/National Disaster Management Agency, and various other related parties in disaster management efforts [39]. [27] also explained that the school must plan actions or strategies before, during, and after a disaster occurs.

Schools had an important role in providing knowledge and information about disasters to students. [42] explained that to instill a culture and disaster prevention measures, students could be encouraged to acquire basic knowledge related to disasters, behavioral readiness, awareness programs, adaptation processes, and perceptions of risk techniques. Optimizing the role of schools could be done by implementing disaster prepared schools. Implementation of school-based disaster preparedness

programs focused on safe learning environments and preparedness of school communities [36]. It was hoped that the birth of the Disaster Preparedness School would be able to identify learning and resistance to disasters that occur [43]. [44] argued that Disaster Preparedness School was an effort to build school preparedness to anticipate disaster risk through strengthening knowledge and attitudes, emergency response plans, early schools, disaster warning systems, and resource mobilization. The implementation of disaster preparedness schools was certainly an effort to reduce disaster risk, especially for students.

Each country or region had its program in an effort to minimize the risk of disasters, especially natural disasters. These efforts had actually been initiated by the Indonesian government in 2009 by incorporating the disaster education curriculum into the Disaster Preparedness School curriculum [43]. However, due to curriculum changes that continued to occur in Indonesia or due to various other factors, this program was inconsistently implemented this country. Another example, in the Seattle district (Nathan Hale Senior High School), implemented various programs to equip students for efforts to reduce disaster risk through implementing a program of non-structural retrofit activities in schools and projecting educational videos as a final project [25]. It was hoped that the implementation of disaster education in schools could be useful in increasing community disaster preparedness, especially for students. However, another thing that needed to be underlined was the importance of promoting disaster education in the community and family environment [42].

4. CONCLUSION

The results of this study indicated that the level of student preparedness was in the ready category (74%). Preparedness was an important component in efforts to reduce the impact of disasters, especially for vulnerable groups. Children as one of the vulnerable groups should be provided early on in disaster preparedness. Education, outreach and training on disasters were efforts that could be given to children to prepare them for disasters. Various indicators such as knowledge, emergency response plans, early warning, and resource mobilization were determinants of disaster preparedness, especially natural disasters. The thing that was needed to be emphasized in this research was the need for consistency of schools, parents, communities, government and non-governmental organizations to optimize student preparedness in dealing with natural, non-natural, and social disasters. This could be done through collaboration and synergy between schools and BNPB in conducting disaster training for students. Another thing that could be done was designing a curriculum that contained disaster preparedness and mitigation as a disaster management effort in an integrated subject at all levels of education without exception. This study had limitations that only focused on the school environment, subsequent research could focus research on a wider scope with more complex determinants of preparedness indicators.

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