



Student Knowledge of Fire Disasters in Senior High School: The Case Study at Man 1 Aceh Besar

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Abstract

Fire disasters can occur anywhere and anytime. Therefore, fire disaster science needs to be taught to students through extracurricular activities. This study aims to measure students knowledge of fire disasters. The research data were obtained from a questionnaire given to respondents. The study population was all students of class XI with a total of 136. The sample selection was done by using students' random sampling techniques and using the Slovin formula, as many as 57 students obtained respondents. Data analysis was performed using the percentage formula. The results showed that the average student knowledge of 48% of students understood the fire disaster, 46% of the factors that caused the fire disaster, 42% understood the types of fire, 41% knew the type of light fire extinguishers, and 42% knew the classification symbol Fire. It can be concluded that the level of student knowledge of fire disasters is on average 47%. This shows that students' knowledge of fire disaster is still low.

Keywords: *Disaster; Fire; Knowledge; Student*

1. Introduction

Indonesia has a vulnerability to global climate change which is believed to be increasing and the number of natural disaster events, the community must realize how important it is to immediately build commitments in disaster risk reduction (Konsorium Pendidikan Bencana, 2011). Fires caused by natural events are included in the category of natural disasters, for example forest fires caused by drought or volcanic lava. Fires included in the category of complex disasters are residential fires, buildings, tools, transportation caused by human activity or technicians (Priambodo, 2009: 75).

Forest and land fires as well as fires that occur in community settlements. Very severe forest fires occurred in 2017 in Riau, this is due to the prolonged drought climate and there are allegations by human activity itself that deliberately burned the plantation land, resulting in very large forest fires. This is certainly very impacting the community, not only the Riau region, even Medan, Aceh, and neighboring countries such as Malaysia and Singapore are also disturbed by the smog from the forest fires. This fire

has become a subscription in Indonesia every year, as in the past three years, namely in 2015, 2016, and 2017.

The fire disaster occurred at Bank Aceh precisely on April 22, 2015 which killed one of its employees and estimated losses of hundreds of billions. Another fire disaster occurred at the Simbun Sibreh grocery store in Banda Aceh Dipenogoro street area on Sunday 10 May 2015, another fire case occurred on Daud Bereueh street, Kuta Alam sub-district, Banda Aceh City, located next to Zainal Abidin General Hospital which caused three food stalls, one supermarket and one shop house (shop) to catch fire, in addition to that a fire had also just occurred on Tgk. Shama'un, Attorney Intersection. The last fire occurred in the Greater Aceh area precisely in the Darul Imarah sub-district on Monday January 19, 2017 which burned down a permanent housing unit at around 18:20, allegedly due to a technical error, namely an electrical short circuit. Lack of knowledge regarding prevention and control measures before and during the fire that causes the community unable to mitigate risks caused by fire disasters. This is also caused by technical errors and human negligence.

Judging from the various fire disasters above, the knowledge about fire and fire risk mitigation to the community is very important to be applied in schools so that the community or school community can act right at the time of the fire so it does not pose a risk of large losses due to the fire.

Based on the description above, it is necessary to increase students' knowledge about fire disasters through the fire disaster mitigation module which contains a set of planned learning experiences and is designed to help students master specific learning goals, also to practice directly through real activities on how to mitigate, how to use tools proper fire extinguisher, and how to save yourself from a fire disaster, all of this is available in the module. Considering the core subjects that are full in teaching and learning activities every day, for this learning module is planned in each extra-curricular activity per semester.

Previous studies have shown that students' knowledge is still very low in fire emergencies (Anggraini, et al., 2016). Research Septiadi (2012) shows that there is a difference between the level of knowledge and the speed of evacuation after an intervention by providing pre and post test questions and emergency response simulations. Research Herni (2014), that students' knowledge of earthquake disasters is in the moderate category. The results of this study indicate that students' abilities in disasters are still lacking, especially in fire disasters. This will be a big problem, because students have no knowledge of the fire disaster.

This study aims to analyze students' knowledge of the fire disaster conducted at MAN 1 Aceh Besar, namely through extracurricular activities. This extra-curricular activity can certainly give students an understanding of how to do risk reduction and prevention efforts from an early age through learning modules. Students will be a mouthpiece for all parties both for themselves, their families, neighbors and even all people both known and unknown so that they can make efforts to reduce risk, so that the risk of fire caused can be minimized. This study aims to increase students' knowledge of fire disasters through the fire disaster mitigation module.

2. Literature Review

According to ministerial regulation public works No. 26 / PRT / M / 2008, fire hazard is a hazard caused by a potential threat and the degree of exposure to fire from the beginning of the fire to the spreading of the fire that causes smoke and gas. According to the NFPA fire can be defined as an oxidation event involving three elements, namely fuel, oxygen, and an energy source or heat that results in loss of property, injury, and even death.

Fire fighting can be done by removing one of the elements that can cause a fire to occur. In the book the basics of fire prevention explained that extinguishing techniques include: 1) Cooling / Cooling; 2) Smothering / blanketing; 3) Separating burning material (starvation); 4) Break the reaction chain.

1) Fire Extinguisher

According to PER.04 / Men / 1980 concerning Terms of Installation and Maintenance of Light Fire Extinguishers, Light Fire Extinguishers are a set of tools designed and used to extinguish types of fire that can endanger lives and valuable assets from fires. The development of fire extinguishers always follows the times and technology, both in modern and traditional forms. A portable active fire protection device can be used to extinguish and control fires in emergency situations but not to extinguish large and uncontrolled types of fire such as fire that has reached the ceiling and endangering users where the fire situation closes the way out (escape), danger will be deprived of oxygen (O₂) by smoke, the danger of a potential explosion, etc. or the type of fire that requires handling and expertise from the fire department.

2) How to Work a Light Fire Extinguisher


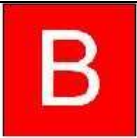


Fire fighting with fire extinguisher is to eliminate one of the causes of fire. The process is carried out by removing heat from burning fuel, removing or transferring oxygen or by giving a chemical reaction. Because of the limited capacity of fire extinguisher extinguishers, its use is only in the initial stages, ie only in the first 5 minutes of a fire.

The initial extinguishing action in the first 5 minutes of a fire is crucial, because if the fire is not extinguished in the first 5 minutes of the fire, the fire will get bigger. How to use a fire extinguisher starting from the base of the thinnest fire, which is behind the wind direction or beside the left or right of the fire (the basics of fire prevention).

3) Classification Symbols On Fire Extinguisher

The Symbols on the Fire Extinguisher Tubes consist of four types of fire classes (standard American version). It aims to classify the media of fire extinguisher tubes with the class of fire so as to achieve suitability that impacts the effectiveness of the fire extinguisher itself.

Table 1 Symbols of Fire Classification

 Ordinary Combustible	For class A fires is an ordinary combustible with an equilateral triangle symbol that is given a green base and then in the middle it says the letter A with Ordinary Combustible .
 Flammable Liquids	For class B fires are flammable liquids with a square symbol symbol with a red base color while in the middle bearing the letter B with the words Flammable Liquids .
 Electrical Equipment	Classification of fire class C is electrical equipment with a symbol of a circle and is given a blue base and in the middle it says C with the name Electrical Equipment .
 Combustible Metals	In class D are combustible metals with a five star symbol with a yellow base color and in the middle it says D and it says Combustible Metals

Source: Protection, Badger Fire (2009).

Natural disasters can occur suddenly without the arrival of them. Disaster events always have a shocking and detrimental impact on both property and life. Disaster risks that arise may occur due to lack of preparedness and community vigilance in dealing with disasters. By recognizing the conditions and potential of the region, it is hoped that they will be more aware of their environment (BNPB, 2012). Building preparedness is an important element, but it is not easy to do because it involves mental and cultural attitudes and discipline in the community. Preparedness is the most strategic stage because it really determines the resilience of community members in the face of a disaster coming (Ramli, 2010).

Preparedness can be interpreted as: "The readiness of people at all levels to recognize the threats that surround them and have mechanisms and ways to deal with disasters". Preparedness is carried out in the stages of disaster management and aims to build the capacity needed to effectively be able to manage all kinds of emergency situations and bridge the transition period from response to sustainable recovery (Nugroho, 2012).

Disaster preparedness efforts include: contingency plans, preparation of health facilities and infrastructure, preparation of operational funds, formation of a rapid reaction team (disaster alert brigade), early warning system development, dissemination of information on health problems due to disasters, rescue efforts, ways to help, assistance plans, ways survive before help arrives (Pusat Kajian Pembangunan Kesehatan SekJen Depkes, 2009).

A disaster prepared school is a school that has the ability to manage disaster risk in the environment and its community. This capability is measured by having a plan in disaster management (before, during and after a disaster), the availability of logistics, security, and comfort in the educational environment, infrastructure, and emergency systems, which are supported by the knowledge and capability of preparedness, permanent procedures (operational standards procedure), and early warning systems (Konsorsium Pendidikan Bencana, 2011).

3. Method

3.1 Population and Sample

The population used in this study was class XI students, totaling 136 students. For more details, it can be seen in Table 2.

Table 2 Breakdown of Total Population in MAN 1 Aceh Besar

No	Population Student Class XI	Number of people
1	Male	61
2	Female	75
Total		136

Based on the population number, it can be drawn in this study based on the Slovin formula (Sevilla et al, 2008), namely:

$$n = \frac{N}{1 + Ne^2}$$

Information:

n = sample

N = total population

e = the desired critical value (accuracy limit) (percent of allowance for inaccuracy due to population sampling error)

In the Slovin formula there are provisions as follows (Sevilla et. al, 2008):

The value of $e = 0.1$ (10%) for a large population.

The value of $e = 0.2$ (20%) for a small population.

Based on a sample calculation of 57 people, and respondents were chosen by random sampling, so that the data obtained will be more representative and the problem and research objectives are more appropriate, then the number of samples can be calculated as Table 3.

Table 3 Details of Number of Samples in Class XI MAN 1 Aceh Besar

No	Class XI Respondents	Total Population (People)	Number Researched
1	Men	61	$61/136 (57) = 26$
2	Women	75	$75/136 (57) = 31$
Jumlah		136	57

3.2 Data Collection Sources and Techniques

1. Data source

- 1) Observation, field data obtained through direct observation or careful and direct review of MAN 1 Aceh Besar.
- 2) Response questionnaire, which is the questionnaire sheet given to students.
- 3) Secondary data sources, namely data in the form of documentation relating to fire disaster mitigation support equipment.

2. Data collection technique

- 1) Conducting direct observation of the activities of students of MAN 1 Aceh Besar.
- 2) Give questionnaires to students to find out the extent of student knowledge of fire disasters.
- 3) Documentation relating to photographs of research and initial survey of the completeness of supporting tools for fire disaster mitigation activities.

4. Results and Discussion




The analysis phase has been carried out to determine the level of student knowledge of fire disaster mitigation. This was done using a questionnaire given to 57 students at MAN 1 Aceh Besar. Researchers assess students' needs for the knowledge they have about fire disasters and researchers directly examine the facilities and infrastructure related to fire disaster mitigation owned by MAN 1 Aceh Besar. The goal is to be able to easily arrange material that is suitable for students' needs and to obtain information that will be used as a basis for the material.

Based on the results of a needs analysis conducted by researchers of 57 respondents in MAN 1 Aceh Besar students using questionnaire aids that have been designed to determine the level of student ability regarding fire disaster mitigation.

Based on the results of preliminary research conducted on 57 respondents in MAN 1 Aceh Besar, in the category of knowledge about fire disasters, in the statement of what is meant by fire disasters, a score of 56 out of a total score of 100 answers an oxidation event involving 3 elements, a score value 43 answering the danger caused by potential threats, and life-threatening events only get 44 out of the total value of 100. The average value on the first question indicator only gets 48, this shows the weak level of knowledge of respondents in knowing what the definition of fire disaster.

Table 4 Fire Disaster Knowledge

No	Question	Scor					Average
		Yes	No	do not know	Total	Scor at Indikator	
1	In your opinion, what is meant by a fire disaster?						48
	a. An oxidation event that involves three elements, namely fuel, oxygen, and energy or heat sources that result in loss of property, injury, and even death.	46	18	0	64	56	
	b. Danger caused by potential threats	18	31	0	49	43	
	c. Events where resources, personal or material available cannot control these extraordinary events that can be life threatening, physical resources, and the environment.	16	34	0	50	44	
<i>Source: Permen PU 1997, Ramli 2010, dan Lestari 2011</i>							
2	What factors can cause a Fire disaster?						64
	a. Human factors such as throwing cigarette butts carelessly	82	7	0	89	78	
	b. Technical factors such as electrical shorting	64	11	0	75	66	
	c. FNatural factors such as lightning, drought, and volcanoes erupt	32	22	0	54	47	
<i>Source: Dewi Kurniawati, 2011</i>							
3	In your opinion, does the explanation below include the types of fire?						42
	a. Class A is fire on flammable materials such as paper, wood, foam rubber and others.	16	8	0	24	21	
	b. Class B is a liquid material fire which is easy to cause a flame (flammable) and combustible liquids (combustible) such as gasoline, solvents, paint, alcohol, asphalt, oil, gas, LPG and others.	32	19	0	51	45	
	c. Class C is a high voltage electric fire	52	16	0	68	60	
<i>Peraturan Menteri no.04/MEN/1980</i>							
4	What types of lightweight fire extinguishers do you know						41
	a. Fluid type of fire extinguisher	32	15	0	47	41	
	b. Foam type fire extinguishers	42	14	0	56	49	
	c. Chemical powder fire extinguishers	16	20	0	36	32	
<i>Peraturan Menteri no.04/MEN/1980</i>							

No	Question	Scor					
		Yes	No	do not know	Total	Scor at Indikator	Average
Do you know the fire classification symbol below?							
5	a. 	18	29	0	47	41	42
	b. 	22	25	0	47	41	
	c. 	16	32	0	48	42	
Protection, Badger Fire. 2009							
Average Score Score							47

Based on Table 4, it can be seen, the indicator question number two about what factors can cause fires, human factors such as carelessly throwing cigarette butts get a score of 78, technical factors such as electrical shorting get a value of 66, and a value of 47 for natural factors, on indicators This, the average value obtained is quite high at 64. Indicators of the next question about the types of fires, from the total of respondents, the average score is below 40. This indicates that the respondent's weak level of knowledge about the types of fires.

The next indicator about the respondent's knowledge of the type of fire extinguisher, on average the respondent on this indicator scores a score of 41. This results in a weak level of respondents' knowledge of the fire extinguisher media. The last question indicator about the fire classification symbol, in this indicator respondents get a score of 42. This also indicates that the level of knowledge of respondents is very weak against fire disasters.

Based on the results of research on respondents' knowledge of fire disasters, a total total score of 47 is obtained, this shows the low level of respondents' knowledge of fire disasters. In the second indicator on fire disaster management, in the statement about what respondents did when a fire broke out at school, the act of running out of the room got a score of 94, a value of 100 for the statement away from the point of fire, and a value of 82 indicating going to an empty land or place safety. The average respondent answered correctly and got an average score of 92 on the indicator of this statement, this shows at this point the respondent knows what to do in an emergency in the event of a fire disaster.

Based on students' knowledge of fire disaster mitigation through a questionnaire distributed to 57 respondents in MAN 1 Aceh large students, then the indicator of knowledge about fire obtained an average score of 45 and the fire prevention indicator obtained an average value of 59.

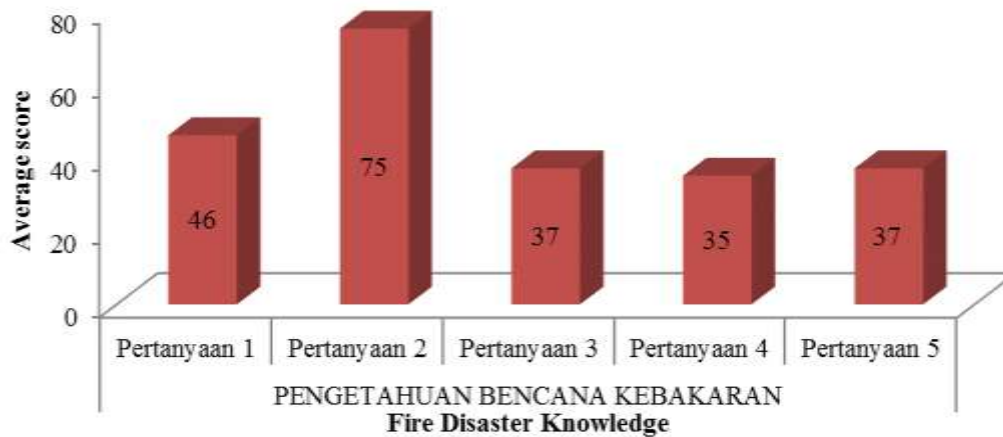


Figure 1 Total Scores on Fire Disaster Knowledge Indicators Questions
(Source: Research Results, 2019)

Conclusion

Based on the results of the study it can be concluded that students' knowledge of the fire disaster is still low. The level of student knowledge of fire disasters averaged 47%. This shows that students' knowledge of fire disaster is still low.

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