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## Earthquake Disaster Preparedness for Students of Junior High School

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### ABSTRACTS

Disaster preparedness is one of the actions to reduce the impact of disasters, especially earthquakes. One of the locations that has a risk of fatalities is the school. This study aims to determine the level of knowledge of students regarding student preparedness in an earthquake disaster and provide guidance. This research was conducted using quantitative descriptive techniques and primary data collection techniques random sampling obtained from 102 student respondents. From the comparison of the pre-test and post-test, the students showed an increase in grades that had entered the good category with an average percentage of students above 70%. This happened because of the provision of earthquake disaster preparedness materials to the students. The results showed that the level of knowledge students in preparedness for earthquake natural disasters was in good category.

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## 1. INTRODUCTION

Preparedness is important for organizations, families, and individuals to be able to handle disaster situations and possible disaster events. Preparedness capabilities can be important in responding to a disaster. Disaster is a phenomenon or series of events that threaten human life caused by several factors, both natural factors and non-natural factors as well as human factors (Maharani, 2020). The impact of a disaster results in material and non-material losses such as environmental damage, psychological effects, and the emergence of fatalities as a result of the disaster. These losses occur due to a lack of knowledge and community preparedness in anticipating disasters. Earthquake is one of the natural disasters, physical symptoms or natural events which are generally marked by shaking/shaking of the earth. One of the provinces that is prone to earthquakes is West Java which has a Lembang fault which will have an impact if there is a shift in the fault it will cause an earthquake.

Previous research aims to analyze and enrich the research discussion. This study refers to 5 previous research journals related to students' awareness of earthquake disaster preparedness. The first research reference with the title "The Effect of Disaster Experience on Students' Preparedness in Facing Earthquake Threats" and Tsunami published in the 2016 UPI Geography Education Journal (Havwina et al., 2016). The level of preparedness shown by students was influenced by the internal factors of the students themselves, namely the disaster experience, even though the relationship was moderate (Havwina et al., 2016). The next study entitled "The Relationship of Self Efficacy with Earthquake and Tsunami Disaster Preparedness in State Senior High School Students 2 and 6 Banda Aceh" stated that there was a significant and very strong relationship between self-efficacy and disaster preparedness. in high school students in Banda Aceh (Syarif & Mastura, 2015). The next source of bibliography is research with the title "Mapping Knowledge of Preparedness for Earthquake and Landslide Disasters at Muhammadiyah Schools in Karanganyar Regency". Taken from the Journal of Georafflesia. Written by Kharina Rahmanika, Danick Wahyu Pratiwi, Henny Novita Sari, Iqbal Ghozy Murtadlo, Muhammad Anis Toha, Candra Andi Wardoyo in 2018 (Rahmanika et al., 2018). Furthermore, the author also uses a research reference with the title "School Community Preparedness in Facing Disasters in Magelang Regency" written by Cindrawaty Lesmana and Nurul Purborini in 2015 which state (Lesmana & Purborini, 2015). Finally, as a reference with the title "Elementary School Preparedness in Facing Earthquake and Tsunami Disasters in Pariaman Tengah District, Pariaman City" states that the level of earthquake preparedness and the perceived difficulties in preparing for an earthquake is assessed both before and after the disaster occurs (Maidaneli & Ernawaty, 2019). The difference between this research and previous research is the object and the research period.

Seeing this, we took the title of Earthquake Disaster Preparedness for Students at to find out how the knowledge of students about earthquake disaster preparedness and provide direction and knowledge on how to be prepared for earthquake disasters. This is of course necessary for students so that they can apply it when the earthquake occurs at any time. The purpose of this study was to determine the level of knowledge about student preparedness related to earthquake disasters and to provide direction and knowledge on how to be prepared for earthquake disasters.

## 2. THEORITICAL FRAMEWORK

Preparedness is an effort made to anticipate disasters through organizations that can reduce the risk of disasters. The level of preparedness for earthquakes can be measured by taking into account factors, namely knowledge and attitudes, emergency response plans, disaster warning systems, and resource mobilization (Rusiyah, 2017). Low understanding in dealing with earthquake disasters is the root of ignorance and lack of concern about disaster preparedness, resulting in many casualties. Structures and building materials that are not earthquake resistant and are not equipped with evacuation routes indirectly become one of the factors of vulnerability to earthquake hazards.

Earthquakes can also have a psychological impact that can cause trauma to victims and volunteers who experience the disaster. The impacts and losses caused by the earthquake are caused by the lack of readiness of the community or the surrounding community in anticipating the problem (Daud *et al.*, 2014). History proves that the earthquake and tsunami that occurred in Indonesia resulted in great losses of both property and life. Among the fatalities, the most were the elderly and children. Lack of awareness and knowledge about disasters, both potential areas of residence and lack of knowledge about rescue actions when a disaster occurs.

Awareness of the importance of disaster preparedness can increase individual actions in protecting and saving themselves from disaster hazards (Devi & Sharma, 2015). Preparedness has four components that are used as parameters in evaluating earthquake disaster preparedness, these components are: knowledge and attitudes about earthquake disaster risk, emergency response plans, disaster warning systems, and resource mobilization (Rahmawati, 2016). One way to increase knowledge is through education. Disaster education is a determining factor in reducing disaster risk. Efforts to form education for students through the provision of materials on earthquake preparedness.

## 3. METHODS

In this study, this study uses a quantitative approach with data collection techniques using random sampling. The data collection technique taken in this study is primary data, The advantage of this sampling technique is its simplicity. Data were obtained from student respondents by distributing questionnaires regarding earthquake preparedness before and after socialization. The population in this study were 102 students in 9th-grade junior high school. The sample used in this study is 102 students in 9th-grade junior high school through the Google form. After complete data is collected, then data processing is carried out. The data analysis techniques used are: quantitative methods through quantitative descriptive. Over all this research method has stages, namely data collection, processing, analysis and conclusion as well as output produced in the form of a national journal accredited.

## 4. RESULTS AND DISCUSSION

### 4.1. Demography

In order to reach valid conclusions about the factors that affect respondents' knowledge of earthquakes, we examine the effects of several groups of factors. Frist we examine the influence of demographic characteristics such as: gender, education, literacy, parental socialization, and knowledge of the meaning of earthquakes. Next, we examine the effect of

the place and/or medium from which respondents obtain information about earthquakes. We examine the influence of their personal experiences or the experiences of their immediate family members with respect to earthquakes. These results determine whether the education of secondary school students has the same degree of influence in areas that have major consequences of earthquakes. Other than that, the researcher also found out the level of interest and desire of students to learn more about earthquake preparedness. The results of this exploration allow selection of the best way to learn about earthquakes.

**Table 1** shows student activities is carried out using a questionnaire sheet instrument, which contains aspects of observation or observation indicators which include four aspects, namely Knowledge, Interest, socialization and literacy. For the purpose of this study, a sample of 102 student respondents was taken from a total population of 135 students who have adequate knowledge, interest, and literacy level, as well as socialization experience in grade 9. Sampling was used, where during the first stage it was distributed to all 9th graders, the response rate was around 85%. To get an idea of the representativeness of the sample, it is necessary to analyze the structure of the respondents according to the main characteristics in the field. Based on the questions given referring to the factors of knowledge, interest, socialization and literacy, it can be concluded that the average student respondents do not read and do not participate in socialization, but students are interested in studying the science of earthquake disaster preparedness. With students' interest in disaster preparedness, there is an opportunity to provide preparedness knowledge in various ways such as media literacy which may increase students' knowledge. Research procedures adapted to research needs.

**Table 1.** Students' demography

No.	Influence Factor	Gender		Total
		Male (Student)	Woman (schoolgirl)	
1.	Knowledge	17	54	71
2.	Interest	12	24	36
3.	Socialization	56	23	79
4.	Literacy	12	23	35

#### 4.2. Phenomena in the learning

In this case the researcher argues, that by providing material on earthquake disasters can increase students' knowledge of earthquake disaster preparedness, with increasing student knowledge about earthquake disaster preparedness it will increase the level of preparedness in the event of a disaster. The implementation of the lecture on earthquake preparedness took place at Junior high school 3 Margahayu Bandung, Indonesia. The activities carried out are:

- (i) First, starting with a pre-test which shows students' knowledge of disasters,
- (ii) Continued with presentation of earthquake preparedness materials,
- (iii) The latter did a post test to determine knowledge after being given teaching and learning related to disasters, so that from the results of the pre posttest the researchers could determine the level of preparedness of students to face earthquake disasters.

After being given lessons related to disasters, so that from the results of the pre-posttest, researchers can determine the level of preparedness of students in dealing with earthquake disasters. With a better level of preparedness, students are also better prepared to face an earthquake whenever a disaster occurs. Students are able to reduce the risk of disasters in their environment, so as to minimize losses and casualties due to disasters, especially earthquakes.

#### 4.3. Pre-test and post-test result

Based on the average value of the Pre-test Post-test for earthquake preparedness, it can be seen from the initial knowledge test (Pre-test) that the Pre-test value is much different between the Post-test scores. Giving questions about basic knowledge in earthquake disasters at the time of the Pre-test showed results that were already in the good category with the average percentage value of students above 70%. After students were given material in the form of power points and articles on earthquake preparedness, students' knowledge increased with the smallest increase of 7% and the largest increase of 21% on the questions given. However, there is a question regarding the type of material against earthquake shocks in number 10 which the Post-test results are not too large compared to other questions. This may happen because not all learning can be effective through the provision of material, especially reading, but there must be learning practices. **Table 2** shows the difference in student learning outcomes regarding before and after giving the material and seeing how much students improve on earthquake disaster preparedness.

Results show some discussion points:

- (i) The results of question number one increased by 8% when given earthquake preparedness literacy.
- (ii) The results of question number two increased by 10% when given earthquake preparedness literacy.
- (iii) The results of question number three increased by 7% when given earthquake preparedness literacy.
- (iv) The results of question number four increased by 20% when given earthquake preparedness literacy.
- (v) The results of question number five increased by 9% when given earthquake preparedness literacy "
- (vi) The results of question number six increased by 14% when given earthquake preparedness literacy "
- (vii) The results of question number seven increased by 21% when given earthquake preparedness literacy.
- (viii) The results of question number eight increased by 17% when given earthquake preparedness literacy.
- (ix) The results of question number nine increased by 20% when given earthquake preparedness literacy.
- (x) The results of question number ten increased by 15% when given earthquake preparedness literacy.

**Table 2.** Students' pre-test and post-test result.

NO.	QUESTION	TEST RESULTS		Ascension (%)
		PRE-TEST (%)	POST-TEST (%)	
1.	What is a natural disaster?	84	92	8
2.	Examples of natural disasters include?	86	96	10
3.	The following are characteristics of an earthquake?	90	97	7
4.	What do you think caused the earthquake?	77	97	20
5.	After an earthquake, is it usually followed by a disaster?	70	79	9
6.	Why does Indonesia have a lot of potential for earthquake disasters?	70	84	14
7.	What would you do, if there was an earthquake and you were in school?	76	97	21
8.	When there is an earthquake at school and your friend is injured, what should you do?	82	99	17
9.	When the first earthquake has occurred, should we look for a place where?	76	96	20
10.	What types of materials do you know against earthquake shocks?	55	70	15

#### 4.4. Discussion

Based on the results of the Pre-test Post-test, it can determine the difference in the level of students' abilities in earthquake disaster preparedness. Many factors affect the level of preparedness, including gender differences with different interests and interests to study disaster preparedness. However, the factor of gender differences did not significantly affect preparedness (Hawvina et al., 2016). There was a very influential factor, namely the literacy level of each student. This proves that the literacy level of each student is very important, from this study it was found that the average Pre-test score was very low compared to the Post-test score, which had previously been taught through readings on preparedness. In measuring the increase in scientific literacy through tests, it does not merely show that the scientific literacy of students is good or not, but must be addressed with increasing literacy in each student.

It can be concluded from the results of the google form that has been filled out by the students above, stating that with the increase in the literature that has been given to students about earthquake preparedness, it adds insight to each individual and is satisfied with the results. Thus, the questionnaire to determine student responses to earthquake disaster preparedness can be assumed that students respond very positively to the literacy socialization approach to increase student preparedness, this shows that the learning method through literacy is considered quite effective if it can be packaged in an attractive form that will increase interest in learning so that learning outcomes can be optimally in accordance with the expected competencies. This also indicates that students are happy with the provision of earthquake disaster preparedness materials. The following **Figure 1** show the results of a research survey using google form media which is distributed to students, relating to student satisfaction with the material taught using the given literacy media. Obtained results as shown in the following diagram.

## DOES THE RESULT OF LITERACY ON EARTHQUAKE PREPAREDNESS THAT HAVE BEEN GIVEN ADD TO YOUR INSIGHT?

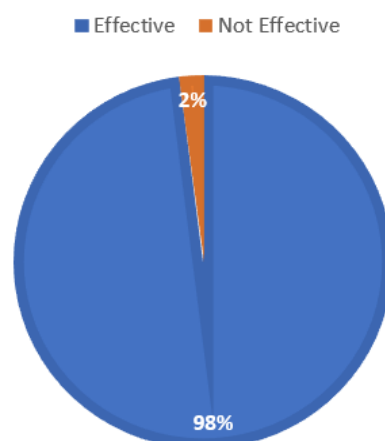


Figure 1. Students' Insight Chart.

### 5. CONCLUSION

The level of students' knowledge of earthquake preparedness is included in the good category. This is influenced by the experience factor and the level of student literacy which makes students more prepared in the event of an earthquake. With the provision of socialization again, students' preparedness is maximized and appropriate actions are taken before and after an earthquake occurs under any circumstances.

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### 7. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

### 8. REFERENCES

Daud, R. D., Sari, S. A., Milfayetty, S., and Dirhamsyah, M. (2014). Penerapan pelatihan siaga bencana dalam meningkatkan pengetahuan, sikap, dan tindakan komunitas sma negeri 5 banda aceh. *Jurnal Ilmu Kebencanaan: Program Pascasarjana Unsyiah*, 1(1), 26-34.

- Devi, A. W., and Sharma, D. (2015). Awareness on earthquake preparedness: a key to safe life. *International Journal of Nursing Research and Practice*, 2(2), 1-6.
- Hawwina, T., Maryani, E., and Nandi, N. (2016). Pengaruh pengalaman bencana terhadap kesiapsiagaan peserta didik dalam menghadapi ancaman gempa bumi dan tsunami. *Jurnal Geografi Gea*, 16(2), 124-131.
- Lesmana, C., and Purborini, N. (2015). Kesiapsiagaan komunitas sekolah dalam menghadapi bencana di Kabupaten Magelang. *Jurnal Teknik Sipil*, 11(1), 15-28.
- Maidaneli, M., and Ernawati, E. (2019). Kesiap siagaan sekolah dasar dalam menghadapi bencana gempa bumi dan tsunami di kecamatan pariaman tengah Kota Pariaman. *Jurnal Kapita Selekta Geografi*, 2(1), 89-100.
- Maharani, N. (2020). Tingkat pengetahuan siswa tentang kesiapsiagaan bencana gempa bumi di smpn 3 Kuta Selatan Badung Provinsi Bali. *Pendipa Journal of Science Education*, 4(3), 32-38.
- Rahmawati, N. F. (2016). Kesiapsiagaan bencana gempa bumi pada siswa smp siaga bencana di Kabupaten Bantul (smp negeri 2 imogiri). *Social Studies*, 5(6), 1-15.
- Rahmanika, K., Pratiwi, D. W., Sari, H. N., Murtadlo, I. G., Toha, M. A., and Wardoyo, C. A. (2019). Pemetaan pengetahuan kesiapsiagaan siswa terhadap bencana gempa bumi dan tanah longsor sekolah muhammadiyah di Kabupaten Karanganyar. *Jurnal Georaflesia: Artikel Ilmiah Pendidikan Geografi*, 3(2), 25-33.
- Rusiyah, R. (2017). Hubungan pengetahuan dengan kesiapsiagaan bencana gempabumi pada siswa taman pendidikan al-qur'an al-khair Kabupaten Bonebolango. *Jurnal swarnabhumi: Jurnal Geografi dan Pembelajaran Geografi*, 2(1), 1-5.
- Syarif, H., and Mastura, M. (2015). Hubungan self efficacy dengan kesiapsiagaan bencana gempa bumi dan tsunami pada siswa sekolah menengah atas negeri 2 dan 6 Banda Aceh. *Idea Nursing Journal*, 6(2), 53-61.