The Mitigation Knowledge and Attitude of Students in *Sekolah Menengah Atas* Boarding School of Inshafuddin Banda Aceh: A Preparedness upon Earthquake and Tsunami Risk Reduction

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Abstract: A descriptive research method through quantitative and qualitative approaches within this research revealed the level of students' knowledge and attitude to anticipate earthquake and tsunami, particularly before and after the drill. Located in SMA Boarding School of Inshafuddin Banda Aceh, this research was conducted for two months. From all students three grades, having 10 classes in total, 75 students were selected as the sample and put into the research design, one-group-pretest-posttest design. The research was then analyzed by directing univariate and bivariate analysis. The univariate analysis showed a positive trend based on the students' increasing level of knowledge to anticipate earthquake and tsunami. Their knowledge was increased from 55.55% (low), which was retrieved before the drill, to 97.37% (very high), which was obtained after the drill. Regarding to the students' responses, they got 56.69% (unprepared), which was gained before the drill. Surprisingly, after the drill, their responses were 100% (extremely prepared). Meanwhile, the bivariate analysis exposed that there was no influence between the students' knowledge and responses towards earthquake and tsunami before and after the drill. The students, nonetheless, should have frequent the dissemination of disaster information, such as mitigation discussion or simulation, to anticipate and reduce the disaster risk.

1 INTRODUCTION

Indonesia is one of the countries having vulnerable location to natural disasters. It is proven by the existence of its geographical location, which is flanked by three active tectonic Earth plates namely, the convergent-moving Indo-Australian, Eurasian and the Pacific Plates. Such location is indeed risky for the occurrence of earthquake. Natural disaster is a series of threaten events and it disrupts the lives of living creatures. Disasters can occur anytime and anywhere, which can be caused both by natural or non-natural and human factors. The catastrophes happened could bring fatalities, environmental damage, property losses, and psychological impacts (*Undang-undang No 24 Tentang Penanggulangan Bencana*, 2007). Therefore, natural disaster preparedness is necessary to anticipate the catastrophe through effective and efficient organizing and methods (*Undang-undang No 24 Tentang Penanggulangan Bencana*, 2007).

Knowledge is the main factor and the key to natural disaster preparedness. The knowledge possessed commonly can influence attitudes and concerns to be prepared to anticipate the disasters. It becomes as one of disaster management processes. Nowadays, the concept of disaster management focuses on the essential of its preparedness, particularly in the prevention activities, which are pro-active, prior to the occurrence of a disaster (LIPI-UNESCO/ISDR, 2006).

Natural disasters can attack anything when they happen, therefore, all individuals must be prepared to deal with it, including boarding school students. When they are at home, their parents are the ones who direct them the ways that must be done to save their lives. On the other hand, in the boarding schools such as *Sekolah Menengah Atas* (Senior High School) Boarding School of Inshafuddin, the dormitory and school committees must be

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responsible for mitigating hundreds of students. Accordingly, based on the background described above and referring to one of points in *Kerangka Aksi Sendai*, an activity to increase the disaster preparedness for an effective response and a better build back, a research entitled 'The Mitigation Knowledge and Attitude of Students in *Sekolah Menengah Atas* Boarding School of Inshafuddin Banda Aceh: A Preparedness upon Earthquake and Tsunami Risk Reduction' was necessary.

The preparedness upon earthquake and tsunami for students in that school is needed to reduce, anticipate and decrease the risk and the impact of loss and human victims in the school environment. Practically, not all teachers had sufficient knowledge and abilities related to earthquake and tsunami. Besides, almost no teachers got information from certain institutions related to natural disasters since both teachers and students were always changing, making the awareness was hard to match.

Nevertheless, by conducting this research, a useful contribution or outcome to the school is expected, either in the form of policies, job descriptions of disaster plan, maps, or module books for the community of the *Sekolah Menengah Atas* Boarding School of Inshafuddin. It is greatly projected that the school is ready to prepare the occurrence of earthquake and tsunami. In addition, the school is expected to become an example, in term of natural disaster preparedness, specifically for other similar schools in Banda Aceh.

2 LITERATURE REVIEW

Disaster preparedness is an activity to anticipate disasters through organizing with appropriate and efficient steps (Triutomo, 2011). Normally, the preparedness is the ability to assess disaster risk, planning, resource mobilization, education and training, response mechanism and information management (Khaira, 2012). According to (IDEP, 2007), disaster preparedness has the aim of reducing threats, people's vulnerability and consequences. This is in accordance with the disaster risk reduction formula, which its capacity should be increased compared with the vulnerability items and the disaster threats themselves.

Furthermore, according to (IFRC, 2000), the comprehensive disaster preparedness strategy includes nine components. They are (1) threats, risks and vulnerabilities, (2) response mechanisms and strategies, (3) emergency response plans, (4) coordination, (5) information management, (6) early warning system, (7) resource mobilization, (8) community education and training, and (9) community-based preparedness. In the disaster management cycle, the preparedness efforts are included in the risk reduction phase prior to the occurrence of disaster. The shifting in the concept of disaster management into a paradigm of disaster risk reduction increasingly emphasizes that disaster preparedness efforts are one of significant stages to decrease the amount of losses arising from disasters (Paramesti, 2011). Similarly, (Blum et al., 2008) reveals one of the most important aspects in the disaster readiness stage at schools, providing an understanding of emergency plan and the reunification process to parents. Additionally, the understanding of using communication tools like TV, radio, telephone, or smartphone, is also necessary as a strategy disaster preparedness. This is also available for information media such as newspapers and posters shown in strategic places, so everyone can find out the information posted.

According to Notoatmodjo (2005), knowledge is the result of knowing and it occurs after a person has sensed certain objects. Sensing occurs through the human senses, namely the senses of vision, hearing, smelling, tasting, and touching. Most human knowledge is obtained through eyes and ears. The knowledge or cognitive thought turns into a vital domain for the formation of one's actions.

Knowledge can be obtained from various sources, education, for instance. Participation in disaster education can help improve respondents' understanding of disaster preparedness. Finnis et al. (2010) studied the level of knowledge, perception and the application of disaster preparedness upon teenagers in Taranaki, New Zealand. The research on the 282 respondents ranging from 13 to 18 years old proved that there were differences in the mean scores of knowledge related to self-rescue behavior during significant disasters within those who had disaster education and those who had not.

Disaster, in the meantime, is a series of events that threaten and disrupt the livelihoods of people caused by natural, non-natural or human factors. The impact of disasters can result in human casualties, environmental damages, property losses, and psychological effects (*Undang-undang No 24 Tentang Penanggulangan Bencana*, 2007). Disasters can also be interpreted as an event caused by nature or human activity and happened suddenly or gradually, so it can lead to the loss of human life, property and environmental damage. The catastrophe occurs outside the capacity of the community with all its resource (UNIDSR, 2009).

Yamasaki and Erika (2012) in their study discovered that natural disasters had no limits. Each area actually had different potential disasters.

According to Syarif and Mastura (2015), earthquake and tsunami became as one of big troubles for every student who had experienced. Students who survive will be more confident, optimistic and assured towards their abilities in facing problems. Students, who have disaster training and played their roles in disaster simulation with their teachers, also will earn optimism and self-confidence. Hyogo Framework compiled by the United Nations states that the education of disaster preparedness is a priority, the Priority for Three Actions – Using knowledge, innovation an education to build a culture or safety and resilience at all levels (Indriasari, 2016).

3 RESEARCH METHOD

This research applied descriptive method by using quantitative and qualitative approaches. This pre-experimental method employed one group pretest t-posttest as the research design. There was t-pretest prior to the application of the research treatment. The same case also occurred for the posttest. By doing so, the accurate research result could be obtained by comparing the situation before and after the treatment (Sugiyono, 2001).

This study aimed to analyze the influence the knowledge and attitude in the risk reduction preparedness of earthquake and tsunami, which was held in *Sekolah Usaha Menengah* Boarding School of Inshafuddin. The population of this research was the whole students of that school, covering the first, the second and the third year classes. Those 10 classes had 295 students in total. The sample determination in this research was determined using probability sampling techniques and simple random sampling as its part. The sample acquired was 75 students.

Furthermore, the instrument of data collection implemented in this study was questionnaire. The data processing included coding, editing, inputting, and cleaning. Those then were analyzed by utilizing univariate and bivariate analyses. The univariate data analysis applied percentage formula while the bivariate data analysis employed the t-test through SPSS 22.

4 RESULT

Based on the results of data analysis, the increase upon 75 samples before and after the drill method could be illustrated as follows:

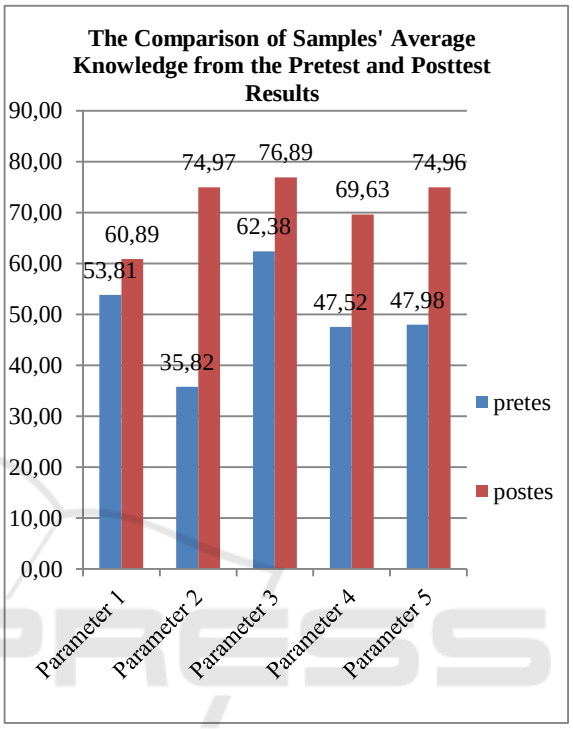

Figure 1: The Comparison of Samples' Average Knowledge from the Pretest and Posttest Results towards Each Parameter

Remarks:
Parameter 1: knowledge and attitude
Parameter 2: policy statement
Parameter 3: emergency planning
Parameter 4: early warning system
Parameter 5: resource mobilitation capacity
Source: LIPI- UNESCO/ISDR, 2006

Based on Figure 1, it could be perceived that there was an increase in the score of knowledge between the scores obtained in the pretest and posttest. Parameter 1 in the pretest obtained 53.81% as the average score meaning that the students had sufficient knowledge. Yet, it increased to 60.88% after the drill was given. Furthermore, Parameter 2 in the pretest showed that the students had low level of policies and guidelines upon disaster preparedness by having average score of 35.81%. It was then increased to 74.96% after getting the drill. Still in the pretest, Parameter 3, in addition, which

was related to the emergency response plan, revealed a high average score of 62.38%. It became higher after the drill was conducted by having average score of 76.89%. Unfortunately, Parameter 4 in the pretest showed that the students' average score was 47.52% and it increased to 69.63% after the offered drill. Parameter 5 in the same test discovered that the students' average score upon resource mobilization was 47.98% and increased significantly to 74.96% after the drill given. Therefore, it could be assumed that there was an increase in students' knowledge on each parameter before and after the drill.

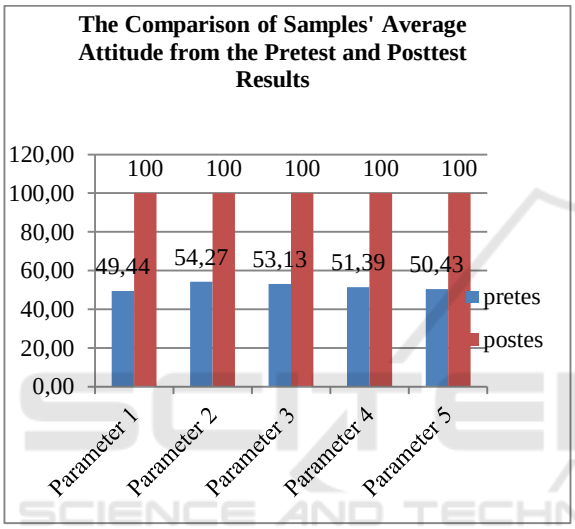

Figure 2: The Comparison of Samples' Average Attitude from the Pretest and Posttest Results towards Each Parameter

Remarks:
Parameter 1: knowledge and attitude
Parameter 2: policy statement
Parameter 3: emergency planning
Parameter 4: early warning system
Parameter 5: resource mobilitation capacity
Source: LIPI- UNESCO/ISDR, 2006

Based on Figure 2, the increase of score obtained in the pretest and posttest was acquired. Parameter 1 in the pretest obtained 49.43% as the average score meaning that the students were not ready for disaster occurrences. Yet, it increased expressively to 100% after the drill was given. Furthermore, Parameter 2 in the pretest showed that the students had low level of policies and guidelines upon disaster preparedness by having average score of 54.27%. It was then increased fully to 100% after getting the drill. Still in the pretest, Parameter 3, in addition, which was related to the emergency response plan, revealed a high average score of 51.39%. It turned higher after the drill was conducted by having maximal average score of 100%. Meanwhile, Parameter 4 in the pretest showed that the students' average score was 51.39% and it increased to a full score of 100% after the offered drill. Parameter 5 in the same test proved that the students' average score upon resource mobilization was 50.43% and increased extremely to 100% after the drill given. Therefore, it could be assumed that there was an increase in students' knowledge on each parameter before and after the drill.

Moreover, the bivariate analysis applied the paired t-test. It was employed since the sample between the pretest and posttest groups was the same. The following displays the analysis result of the paired t-test within the student groups.

Table 1: The Analysis Result of the Paired T-test Distributed to the Student Groups

No.	Variables Tested	P	Conclusion	Remarks
1.	Knowledge	0,430	p>0,05	Ha was rejected
2.	Attitude	0,000	P<0,05	Ha was accepted
3.	Knowledge and attitude (Pretest)	0,439	p>0,05	Ha was rejected
4.	Knowledge and attitude (Pretest))	0,000	P<0,05	Ha was accepted

Based on Table 1, the analysis result of the knowledge variable in the pretest and posttest indicated that there was no influence between the students' knowledge and the earthquake and tsunami preparedness, either before or after the drill. Likewise, the analysis results from the pretest and posttest towards the attitude promoted that there was no influence between earthquake and tsunami preparedness before and after the drill conducted.

5 DISCUSSION

Based on the bivariate analysis result towards the knowledge in the pretest and posttest of the students, Ha was rejected. Literally, there was no influence between the students' knowledge and the earthquake and tsunami preparedness before and after the drill. This was in accordance with the theory of adaptation, particularly if the samples' knowledge level was good. It could form, at least, the good attitude and behavior Widodo AD, et al. (2005). In other words, it brings a concept that there is an influence between the knowledge and attitude. However, the result found was contrary to the theory mentioned. Referring to another research result by Kurniasari Nia (2016), it was contradicted. She said that the level of knowledge, attitude and behavior did not always have a positive relationship towards the disaster mitigation. This reason could be affected by several factors, namely economy and the lack of the Government's support regarding disaster mitigation. Therefore, it proved that the students should be disseminated frequently related to disaster information in the form of knowledge and simulation practice.

Meanwhile, the bivariate result for the students' attitude showed that Ha was accepted. It verified that there was an influence between before and after the drill. According to Ajik & Sarwanto, (1999), knowledge is he predisposition factor where the the change of attitude occurs. Moreover, Notoatmodjo (2005) coins that a big chunk of information received by an individual can affect or enhance his or her knowledge. It also triggers the awareness that she or he should have appropriate attitude in accordance with the knowledge possessed. Similarly, this is the same with the theory of adaptation that if the level of knowledge is good, then it can enhance someone to behave appropriately Widodo AD, et al. (2005). Therefore, those facts and theories led to the assumption that there was an influence between someone's knowledge and attitude.

Moreover, the knowledge of natural disaster preparedness can also be retrieved through disaster education in schools. Teachers and school committees can play their role in conducting disaster drill or role-play, in this case, the earthquake and tsunami simulation can be an option. According to Syarif and Mastura (2015), disasters like earthquake and tsunami become as one of big problems for each students who have experienced those. However, they who survived can be more confident, optimistic and convinced towards their skills in overcoming the problems faced. Besides, students who have participated disaster trainings and got their role-play with their teachers can also earn optimistic and confident.

The same case happened in *Sekolah Menengah Atas* Boarding School of Inshafuddin related with the theory of comfortableness and trust. If the two matters exist, those turn into the explicit knowledge. Comfortableness is a state of good feeling where the condition depends on the feeling of an individual (Ardiana, 2007). Mayer et al. (1995, in Rofiq, 2007) proposes that trust is the willingness of someone to accept or be sensitive towards action committed by other people. It contains expectations that they can do certain action, which is important for the trust giver, without seeing the ability to observe and control the aforementioned parties. The students in *Sekolah Menengah Atas* Boarding School of Inshafuddin were in the state of receiving a new knowledge, yet, they were still in the stage of thinking, not in the stage of a full trust. This state was needed to fix before the new knowledge was associated, transferred and committed, which in the end, those were expected to become a habit.

In addition, according to Ikujiro Nonaka and Hirotaka Takeuchi (1995), the manifestation of knowledge comprise of two things, tacit and explicit knowledge. The former is more subjective and refers to word-unexpressed experiences, while the latter is something objective, real and rationale, which can be expressed in the form of words. Referring to the concept suggested by Nonaka, then the mitigation attitude is included into the explicit knowledge, which can be manifested in the real daily activities of an individual. Therefore, to make it a real habit, the required knowledge should be repeatedly given, so the limit of comfortableness of someone will change into a trust. As a result, an individual is ready to determine appropriate attitude towards what they have known and experienced.

6 CONCLUSIONS

The knowledge level of students' average score towards the mitigation preparedness of earthquake and tsunami in *Sekolah Menengah Atas* Boarding School of Inshafuddin Banda Aceh was sufficient before the disaster drill was employed. However, the average score increased highly after the drill was given. Their average score of the same issue in terms of mitigation attitude was also adequate. Yet, when the drill was conducted, their score increased

signifmnnnn icantly, meaning that they were extremely ready for disaster preparedness. In the meantime, from the pretest result, there was no influence between the students' knowledge and attitude towards their mitigation preparedness of disasters like earthquake and tsunami. Conversely, after the drill was offered, the posttest result proved that there was an influence between the two matters mentioned. This fact provided information that the students should be disseminated more often, specifically related to disaster information. It could be in the form of mitigation discussion or simulation in the school area or dormitory.

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