The effectiveness of disaster prevention and mitigation training for the students in disaster prone areas

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Abstract. The prevention and mitigation of the disasters is the government focus program in the education and training in order to decrease the disaster risks at the predisaster stage, through the National Plan of Tackling the Disasters in 2015/2019. This study aimed to identify the capability of disaster prevention and mitigation training for students in disaster prone areas before and after the disaster prevention and mitigation training compared to the educational video screening and control, to find out the effectiveness of training compared to the educational video screening and control, to compare the effectiveness between the training and the educational video screening and control. This study was conducted at Kajenjeng Inpres Primary School, Makassar City. This research design was a Quasi experiment, that was the Nonequivalent control group design, comprising 75 students, who were chosen using the purposive sampling technique. The students were then divided into 3 groups, namely, the training groups, the educational video screening group and the control group. There were 25 students in each group. The data were collected by the interviewer using the Achievement test with the Structured Interview technique. The data were analyzed using the cross tabulation followed by McNemar and Post Hoc test. The research results indicated that training increased the capability of the disaster prevention and mitigation compared to educational video screening and control. The training had an effective capacity in the disaster prevention and mitigation compared to the educational video screening and control. In the other words, training is an effective method in the disaster prevention and mitigation skills of the students in disaster prone areas and not to the educational video screening nor the control.

1. Introduction

Natural disasters are a serious disruption due to the dangers of nature causing substantial human, material, economic or environmental harm to the ability to overcome them [1]. Around 7.056 disasters occur worldwide and result in an average death of 69,800 per year for all types of natural disasters, an increase from the previous decade [2]. In Indonesia, more than 1,800 disasters occur in the period 2005 to 2015 [3]. As of 2016 there were 2,369 disasters [4]. In South Sulawesi Province in 2016 recorded 51 disasters that resulted in 13 deaths, 58 serious injuries or hospitalization, 38 minor injuries or outpatients and 1106 refugees [5].

Looking at the coming 5 years of disaster and disaster risk, the Government has made an integrated disaster management plan through the policy of National Disaster Management Plan 2015-2019 that is Disaster Risk Reduction Education and Training which is done in pre disaster stage and focuses on the
program of increasing the effectiveness of disaster prevention and mitigation [6]. Based on the 3rd priority of the Hyogo Framework on key educational and training activities, Disaster Risk Reduction knowledge is systematically incorporated in all relevant school curricula levels as well as the use of other formal and informal sources to reach youth and children with information [7]. Completing the next Hyogo Framework on the Sendai Framework is included in the stakeholder role in which children and adolescents as change agents should be given space and modalities to contribute to disaster risk reduction, in accordance with legislation, national practice and educational curriculum [8]. The Declaration of The Asian Ministerial Conference on Disaster Risk Reduction (AMCDRR) adopted in Incheon 2010 specifically calls on the Disaster Risk Reduction stakeholders to improve children's and community-focused preparedness and risk reduction education [9].

Children are the center of attention in disasters because of being one of the most vulnerable groups when disasters occur other than infants, toddlers, pregnant or breast-feeding mothers, the disabled and the elderly [10, 11]. Millions of people including children have died and become homeless and or displaced due to lack of knowledge about disasters, emergency preparedness and disaster risk reduction [12].

In the context of Disaster Risk Reduction (DRR) prevention and mitigation plays an important role [13]. The results show that children attending disaster mitigation training at an early age are able to understand and understand the process of disaster mitigation and its implementation so that if one day the children face disasters can survive and stay alive [14]. In addition to the provision of training, other studies have shown that educational video screening on disaster prevention and mitigation to students has an impact on students where there is influence of screening of "Banjir Bandang Wake Up" to the improvement of attitude and self-efficacy on Banjir Bandang Disaster Mitigation in IV and V grade students Madrasah Ibtidaiyah Bustanul Ulum Desa Kemiri Kecamatan Panti Kabupaten Jember [15].

Therefore, in order to build a culture of safety and resilience in disaster management, especially for children and adolescents in schools [8], it is necessary to make effective disaster prevention and mitigation training on students in areas prone to the plan. This study aims to determine the effectiveness of disaster prevention and mitigation training for students in disaster prone areas.

2. Methods

2.1. Location and Research design.
This research was conducted at Kajenjeng Inpres Elementary School, Makassar City of South Sulawesi. Type of research used is Quasi experiment that is Non equivalent control group design.

2.2. Population and sample.
The population is elementary school students in disaster prone areas with the highest frequency i.e. students from Kajenjeng Inpres Elementary School, Makassar City. The sample is 75 people which is divided into 3 groups such as training group, educational video screening group and control group, each group is 25 people. The sample was chosen by purposive sampling which has met the inclusion criteria i.e. elementary schools in disaster-prone areas with the highest frequency of disasters, have a history of previously affected, elementary school students ages 8 to 12 years old and willing to participate in research through the written informed consent has been issued by the Ethics Committee of the Faculty of Medicine Hasanuddin University in this case is signed by the parent or guardian and witness of the homeroom teacher.

2.3. Method of collecting data.
The data were collected by the test technique that was tested by using the test result (Achievement test) in the form of a series of questions given to the research subjects in each group who became the subject of research with the treatment in the form of training, educational video screening and control both before (Pre test) and after the activity takes place (Post test) [16]. Questions from this instrument are asked to the subject of research through Interviewer with Structured Interview technique where the Interviewer makes the Instrument as a question guide [17]. This is done considering the subject of the study are elementary school students, where many students have not been able to understand the
questions given and have not been able to communicate their understanding and knowledge in writing in earthquake disaster mitigation training [18].

2.4. Data analysis.
Data processed with Excel and the Statistical Package for the Social Science (SPSS) in which first performed the editing, coding, data tabulation and discussion or discussion of research results [16]. Further data is analyzed descriptive/univariate to explain the characteristics of each research variable [19]. Then followed by bivariate analysis that is McNemar test and Post Hoc Test. The McNemar test was conducted to find the relationship between the variables in this case assessing the effectiveness of the training on disaster prevention and mitigation skills in students in disaster prone areas, as a comparison also assessing the effectiveness of educational video screening on different groups and controls [20]. Post hoc tests to compare methods that have the effectiveness of training, educational video screening and control of disaster prevention and mitigation skills on students [21]. In the final stages of discussion or interpretation and drawing conclusions from the results of the analysis on research [19, 22].

3. Results
3.1. Characteristics of the sample.
Table 1 shows the characteristics of the students who sampled the study in each group. The most visited group of respondents from class VI is 18 students (72%) aged 11 years, 10 students (40%) with male gender that is 17 students (68%). The most popular group of educational videos from respondents from class V were 15 students (60%) aged 10 years i.e. 11 students (44%) with male gender ie 13 students (53%). The most control group was found from respondents from the fourth grade, ie 21 students (84%) aged 9 years, 15 students (60%) with male gender, 17 students (68%).

| Group | Characteristics | n  | %  |
|-------|----------------|----|----|
| Grade | 6th            | 18 | 72 |
|       | 5rd            | 7  | 28 |
|       | Total          | 25 | 100|
|       | 12             | 8  | 32 |
|       | 11             | 10 | 40 |
| Training group | Age(year) | n  | %  |
|       | 9              | 1  | 4  |
|       | 8              | 6  | 24 |
|       | Total          | 25 | 100|
|       | Boys           | 17 | 68 |
|       | Girls          | 8  | 32 |
|       | Total          | 25 | 100|
| Grade | 5th            | 15 | 60 |
|       | 4rd            | 10 | 40 |
|       | Total          | 25 | 100|
|       | 12             | 1  | 4  |
|       | 11             | 3  | 12 |
| Educational video screening group | Age(year) | n  | %  |
|       | 10             | 11 | 44 |
|       | 9              | 1  | 4  |
|       | 8              | 9  | 38 |
|       | Total          | 25 | 100|
|       | Boys           | 13 | 53 |
|       | Girls          | 12 | 47 |
|       | Total          | 25 | 100|
| Grade | 6th            | 21 | 84 |
|       | 5rd            | 4  | 16 |
|       | Total          | 25 | 100|
|       | 10             | 5  | 20 |
3.2. Bivariate analysis.

Table 2 shows the results before (pre test) and after intervention (post test) in each group. Significant results were found in the training group that is from 24 students (96%) were unable to pre test to 24 students (96%) who were able to post test. While in the video played education group of 24 students (96%) who were unable to pre-test to 23 students (92%) who were unable to post test, only changed 1 student (4%). Similarly, in the control group of 23 students (92%) who were unable to pre-test 23 students (92%) who were unable to post test. Table 3 shows the effectiveness of each group. The training group has effectiveness on disaster prevention and mitigation ability in students in disaster prone areas with p value = 0.000 (p<0.005). Whereas in the educational video screening and control group did not have effectiveness on disaster prevention and mitigation ability in students in disaster prone areas with the value of each p = 1,000 (p>0.005). Table 4 shows the comparison of the effectiveness of all groups. More effective training methods increase students’ disaster prevention and mitigation capabilities compared with educational video screening and control with p = 0.000 (p<0.005).

### Table 2. Distribution of respondents based on pre test and post test

| Group          | Disaster prevention and mitigation capabilities | Pre test |   | Post test |   |
|----------------|-----------------------------------------------|----------|---|-----------|---|
|                | Incapable                                     | n        | % | n         | % |
| Training group |                                              |          |   |           |   |
|                | Capable                                       | 1        | 4 | 24        | 96|
|                | Total                                         | 25       | 100| 25        | 100|
| Educational video screening group | Incapable                                      | 24       | 96| 23        | 92|
|                | Capable                                       | 1        | 4 | 24        | 96|
|                | Total                                         | 25       | 100| 25        | 100|
| Control group  | Incapable                                     | 23       | 92| 23        | 8 |
|                | Capable                                       | 2        | 8 | 2         | 92|
|                | Total                                         | 25       | 100| 25        | 100|

**Source:** Primary Data 2018.

### Table 3. The effectiveness of training, educational video screening and control

| Group          | Disaster prevention and mitigation capabilities | Incapable | Pre test | Capable | Total | p   |
|----------------|-----------------------------------------------|-----------|----------|---------|-------|-----|
|                | n | % | n | % | N | % |
| Training group | Incapable | 1 | 4 | 4 | 23 | 92 | 24 | 96 | 0,000 |
|                | Capable | 0 | 0 | 0 | 1 | 4 | 1 | 4 | 4 |
|                | Total | 1 | 4 | 4 | 24 | 96 | 25 | 100 |       |
| Educational video screening group | Incapable | 23 | 92 | 23 | 92 | 1 | 4 | 4 | 24 | 96 | 1,000 |
|                | Capable | 0 | 0 | 0 | 1 | 4 | 1 | 4 | 4 |
|                | Total | 23 | 92 | 1 | 4 | 25 | 100 |   |

**Source:** Primary Data 2018.
Tabel 4. Comparison of training effectiveness, educational video screening and control

| Comparison of effectiveness | Training group with educational video screening group | Post test | Training group with control group | Educational video screening group with control group |
|-----------------------------|-----------------------------------------------------|-----------|----------------------------------|-----------------------------------------------------|
| N                           | 25                                                  | 25        | 25                               | 25                                                  |
| p                           | 0.000                                               | 0.000     | 1.000                            |                                                      |

Source: Primary Data 2018.

4. Discussion

In this study it is seen that training increases disaster prevention and mitigation capabilities in students in disaster prone areas compared with educational video screening and control. This increase is due to the seriousness of the trainees in following the material because the material is new and interesting. This is consistent with research that concludes that students follow learning in earnest, both in terms of listening to the information provided and, in the exercises, practiced [18].

Training has effectiveness on prevention and mitigation capabilities in students in disaster prone areas compared with educational video screening and controls. The effectiveness of training this is due to the memory ability of the participants in this case are the children that age 8 to 12 years where they have the memory with the greatest and most powerful intensity [15]. In order to better understand and understand the process of disaster mitigation, this is in line with the study concluding that children attending disaster mitigation training in early childhood are able to understand and understand the process of disaster mitigation and its application [14].

Training methods more effectively improve students’ disaster prevention and mitigation capabilities compared with educational video screening and controls. Because these training methods do not use conventional methods such as classroom teaching, such as more discussion and debriefing, practices or disaster simulations such as creating a disaster risk analysis around the school and a self-sustaining simulation in case of an earthquake, singing together, the catastrophic yell - idle loud hearted and also interspersed with quizzes that if the participant answers the quiz questions will get a reward. This is consistent with research which concludes that students' understanding and resilience taught by disaster mitigation learning models is better than the understanding of students taught by conventional learning models [23].

The disaster prevention and mitigation training also have training modules so that the delivery of materials and practices or simulations is easier to do and facilitates the training. So that can change attitudes, knowledge and behavior of participants in disaster prevention and mitigation that has implications on the ability of disaster prevention and mitigation itself. This is consistent with research which concludes that establishing self-concept in elementary school students in understanding disaster mitigation can change the attitude and behavior of children in the face of natural disasters. Knowledge of self-concept in elementary education student in understanding disaster mitigation is made in module form so that simplify in implementing it [24].

5. Conclusions

Disaster prevention and mitigation training for students in disaster prone areas increases disaster prevention and mitigation capabilities and has effectiveness on disaster prevention and mitigation capabilities compared with educational video screening and control. Training is an effective method of disaster prevention and mitigation skills in students in disaster prone areas compared with educational video screening and control.

6. Recommendations

Disaster prevention and mitigation efforts need to be continued on the students especially those in disaster prone areas. This, of course, requires cross sectoral cooperation in realizing a safe disaster school considering disaster is a complex issue. Children become the main agents in prevention and mitigation activities because they are the front line in the face of future disasters.
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