Short training to improve knowledge of disaster management on basic level: A before and after study

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Abstract. A massive effort to improve community resilience against disasters has been made by the Indonesian government. President Joko Widodo further emphasized this effort by ordering all governmental institutions and local governments to intensify disaster education for all the communities across Indonesia. As a contribution to this effort, Indonesia Defense University conducted a short training on basic disaster management for students, lecturers, and staffs. To evaluate the results of such training, a before-and-after study is used. The aim of this study is to examine if short training could improve participants’ knowledge in disaster management on a basic level. A pretest-posttest design was used to examine 105 participants’ knowledge before and after a five-day intervention consisting of eight basic disaster management courses regulated by the National Disaster Management Agency (BNPB). The grading system is used to understand how much the improvement of each participant, with the possibility of failing if not meeting the score threshold. This study showed that most of the participants’ knowledge on basic disaster management have improved with varying results: 60 percent of participants passed with “excellent” mark, 22 percent passed with “very good” mark, 12 percent passed with “good” mark, and the remaining eight percent failed to pass. This study provides an opportunity for humanitarian actors to use such training in order to improve knowledge in basic disaster management as a means of disaster education. However, long-term evaluation for each participant is required to examine the impact of this training on disaster resilience on community scale.

1. Introduction

Since the 2004 Indian Ocean Tsunami, disaster management system in Indonesia has been improving in terms of institutional aspect. Since then, agencies whose main tasks and functions are to manage disasters in national and local levels have been established and both central and local governments have shifted their focus when it comes to disasters: from disaster response to disaster risk reduction, which emphasized in their development plan. One of their main missions is to strengthen the resilience against disasters in every level of society [1]. To do this, the President has issued an executive order
Disaster education has been recognized as an effective tool to promote a successful disaster management [3,4]. It is proven to help people to respond to disaster accordingly and save more lives. During the 2004 Indian Ocean Tsunami in Thailand, a 10-year-old girl warned tourists at Maik Hao Beach on the upcoming tsunami after observing signs of low tide from the shoreline and bubbles of foam on the surface of the sea that she learned at her geography class [4,5]. Due to her warning, Maik Hao Beach was one of the beaches in Thailand with no reported casualties [6]. Hundreds of kilometres away, the tsunami also hit Simeulue Island, Indonesia with population of about 80,000 people. The waves were as high as 10 meters hit the north end of the island [7]. Miraculously, the disaster only killed 7 people, which was a very low number compared to the casualties in mainland Aceh that reached 300,000 people [8]. It was known later that the people of Simeulue has been practicing an indigenous knowledge called smong, a lullaby sung to children which lyrics described the devastating tsunami that hit the island in 1907 [7,9]. The lullaby was deeply embedded to the island’s culture and was able to help people evacuate faster from the shore to higher ground [7–9]. Above cases are examples how knowledge that is acquired from both formal and informal education have helped people to save their lives and others in the community during disasters.

Having understand the importance, many efforts to educate people on disasters have been done. They aim to raise awareness and increase their knowledge, which will contribute to disaster resilience at a larger scale. Indonesia Defense University as a unit under Ministry of Defense also contributed to disaster resilience on a smaller scale with a short training which aimed to raise awareness as well as equip people with knowledge on disasters and what efforts can individuals made to reduce disaster risks. This study aims to examine if short training could improve participants’ knowledge in disaster management on a basic level.

2. Method

2.1. Training Method

The training was held in November 2019. This research used a before-and-after study. A pretest-posttest design was used to examine participants’ knowledge before and after a five-day intervention consisting of eight basic disaster management courses regulated by the National Disaster Management Agency (BNPB). The courses are:

- Introduction to disasters
- Basic Disaster Management in Indonesia
- Disaster Risk Management
Disaster Emergency Management

Disaster Recovery Management

Logistics and Equipments

Disaster Data and Information Management

Multisector Cooperation in Disasters.

These courses are covers the most basic knowledge on disaster management and were tailored to match disaster characteristics in Indonesia, which covers hydrological, meteorological, climatological, and geophysical disasters [10]. It does not include biological disasters such as disease epidemics. The training methods used interactive lectures, group discussions, role playing, simulations, and quizzes.

The training recruited 105 participants which consisted of 89 students, eight lecturers, and eight academic staffs. No prior experience in disaster management required to be a participant for this training. The participants were divided into three classes: class A, B, and C, each consisted of 35 participants. It was held for five days and closely supervised by the BNPB officials. The trainers involved in this training have completed their training to trainers (TOT) certification issued by Indonesia Disaster Relief Training Ground (INA-DRTG) which is a unit under the BNPB. The pretest-posttest design consists of 30 multiple choice questions and was given on the beginning of the first day and the end of the last day. This method was given by the curriculum of this training by the BNPB, which is suitable for a short term intervention [11]. The final evaluation of the training comprises of three components: posttest score, participants’ proficiency and attitude. The last two components were examined by the trainers and the BNPB officials that served as proctors in each courses which makes them subjective evaluation and is not examined in this research. The grading system is used to understand how much the improvement of each participant, with the possibility of failing.

3. Results and discussion

3.1. Pretest

To determine the baseline, a pretest design is used. The pretest is a multiple choice of 30 questions which covers the eight courses mentioned in Section 2. The pretest is conducted in an online format, using Google Forms to facilitate the scoring process. Below are details of pretest score in each classes.

| Class | N  | Mean  | SD    | Min Score | Max Score |
|-------|----|-------|-------|-----------|-----------|
| A     | 35 | 57.16 | 14.499| 33.33     | 90        |
| B     | 35 | 55.24 | 10.474| 30        | 73.33     |
| C     | 35 | 52.52 | 12.189| 33.33     | 83.33     |

The table above shows the average pretest score of each classes are still below the threshold score of 70 points, which confirm their level of understanding on basic disaster management. This data is useful to see the change of knowledge after the intervention is given.
3.2. Posttest

To see the change of knowledge of all participants, a posttest design is used. The posttest question is a randomized version of pretest with same number of question but both the questions and choices are made random. Below are the details of posttest score in each classes.

Table 2. Details of posttest scores

| Class | N  | Mean | SD  | Min Score | Max Score |
|-------|----|------|-----|-----------|-----------|
| A     | 35 | 92.96| 9.610| 50        | 100       |
| B     | 35 | 88.48| 9.045| 60        | 100       |
| C     | 35 | 84.83| 11.230| 65        | 100       |

The table above shows the average posttest scores of each classes are now above the threshold score of 70 points. The mean final scores of each classes also increases compared to the baseline score. The mean score increase in Class A is 35.8 points; Class B is 33.24 points, and Class C is 32.31 points.

3.3. Final grading

After final calculation of each participants’ performance during the training, excluding evaluation of their proficiency and attitude, final grading of each participant are acquired. The participants final grade was classified into four: excellent (final score 90 – 100), very good (final score 80 – 89), good (final score 70 – 79), and fail (final score <70), with 70 points as the threshold score. Below are the details of final grades on each classes.

Table 3. Details of final grades

| Class | Excellent | Very Good | Good | Fail |
|-------|-----------|-----------|------|------|
|       | N       | %        | N    | %    | N    | %    | N    | %    |
| A     | 29  | 82.86 | 3    | 8.57 | 2    | 5.71 | 1    | 2.86 |
| B     | 19  | 54.29 | 12   | 34.29| 2    | 5.71 | 2    | 5.71 |
| C     | 15  | 42.86 | 7    | 20   | 8    | 22.86| 5    | 14.26|
| Total | 63  | 60     | 22   | 20.96| 12   | 11.43| 8    | 7.61 |
The table above shows that participants who receive grade “excellent” are dominant with 63 participants, 13 of them are able to score full marks in their posttest. Participants who receive grade “very good” and “good” takes 32 percent of all participants. The rest of the participants have to fail for not meeting the score threshold of 70 points.

3.4. Discussion

For overall results, there has been an increase in the participants’ knowledge before and after the training. This shows that short term training can serve as an option to raise awareness and increase knowledge of community on basic disaster management. Below is the comparison of their performance on pretest and posttest.

The graph above shows that there is a huge leap on the percentage of participants who scores “excellent” and “very good” for about nearly 60 percent and 20 percent respectively. The percentage of participants who scores “good” also rise up from eight percent to 12 percent. While the numbers of participants who score above the threshold are increased, the ones who scores below the threshold are massively declined. The biggest difference in pretest and posttest comes from “fail” grade percentage. In the pretest, participants who scores below 70 points are almost 90 percents with most of them only scores 30 points. In the posttest, the percentage of participants who “fail” decreases to only seven percent.

The result of this study is similar to other studies for the same purpose conducted around the globe. For example, Kuntjoro concludes that disaster preparedness training can increase disaster knowledge and attitude of university students in health study program [12]. Similar intervention for health professionals are conducted and able to show positive result [13,14]. Study of Juanita et al shows that disaster training which used simulations rather than just lectures can significantly increase participants
preparedness level [15]. In present study, simulations and lectures are used as training methods. Simulations and mock drills are used to provide participants with experience as real as possible. The difference with other studies is the duration of the training which only takes five days, whereas other studies conduct training for months.

Thus, this results are able to strengthen other studies’ results with similar purpose and to provide an opportunity for humanitarian actors to use a short-term training in order to improve knowledge in basic disaster management as a means of disaster education. This study also proves that the training methods developed by the BNPB are able to raise awareness and increase disaster knowledge of the public regardless of their background. However, to complete this study, further research is required and encourage on long-term evaluation for each participant to examine the impact of this training on disaster resilience on community scale.

4. Conclusion

A five-day disaster management training with given curriculum provided by the BNPB is able to raise awareness and increase disaster knowledge. It is recommended to conduct this training on a larger scale and target those who are in the most vulnerable regions. It is necessary to conduct further study to examine the impact of this training on disaster resilience on a much larger scale.

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