Are we ready for the next strike?

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Abstract. A tsunami’s tragedy happened at Banda Aceh 14 years ago, but most of the city dwellers don’t grasp it clearly the hazardous of it. An un-adequate risk perception may be a contributing factor of this un-adequate preparedness. In general observation, we can make a hypothesis that many people in Banda Aceh are unprepared for the next strike. This study is to examine this hypothesis by studying the preparedness of students at SMP 1 Banda Aceh to the natural disaster of tsunami. An interview survey was carried out to randomly selected students to obtain data on their state of emergency preparedness and to ascertain their attitudes toward disaster. Thirty-one (31) students were interviewed. All the respondents know that the school is located at past tsunami’s inundated area. About >75% respondents, who participated in the survey, have at least an emergency preparedness plan in place, and approximately 81% of these students believe that they know about contingency plan. However, based on the respondents’ response to explain their action if any strong earthquakes strike, only 10% of the respondents have, truly, applied a contingency plan. It is recommended that a contingency plan campaign must be carried out in Banda Aceh.

1. Introduction

Natural disasters occur throughout the world, however the losses to disaster in developing countries are generally much greater than in developed countries in terms of gross domestic product (GDP) percentage or government revenues. The 2004 tsunami is estimated to cause the Province of Aceh loss its capital stock equivalent to 97 percent of their GDP [1].

In term of human perception, most of the Banda Aceh’s city dwellers know about the tsunami’s tragedy that happen at Banda Aceh 14 years ago. However, the authors believe, that most of the city dwellers don’t grasp clearly the hazardous of this tsunami disaster. Tsunami is a rare event, but it will happen again someday [2]. And the question is ‘Are we ready for the next strike? Many countries have been damaged or affected by the 2004 Indian Ocean tsunami [3] including our country in this specific city of Banda Aceh [4]. The tsunami was triggered by the second largest recorded seismic ([5]; [6]). This historical tsunami disaster just made some nations to be more aware for the next disaster by creating a contingency plan, instead of just an emergency operation plan. A contingency plan is a...
specific plan designed to take an escape action due to the possible future disaster event including tsunami. This contingency is prepared to help the people to respond effectively to a significant peril phenomenon [7]. Considering it’s a substantial disaster, contingency plan is important for people as it allows people to continue on with their lives and return to their normal daily operations as quickly as possible after an unforeseen event occurs. An example of a contingency plan for this tsunami disaster is conceivably going to higher buildings nearby. In the case of Banda Aceh, tsunami contingency plan is crucial as the city was damage badly during the 2004 tsunami. A contingency plan is more than emergency plan [8]. The differences between the contingency plan and the emergency plan is outlined in Table 1.

| Aspect                     | Contingency plan                      | Emergency Operations Plan                  |
|----------------------------|---------------------------------------|--------------------------------------------|
| Relation to emergency event| Before                                | During                                     |
| Scope of plan              | Global or scenario based              | Both strategic and specific                 |
| Partners involved          | All likely partners                   | Operational and implementing partners only |
| Focus                      | Developing agreed scenarios           | Effective and rapid response                |
| Relationships              | Developing                            | Utilizing                                  |
| Planning Style             | Consultative                          | Directive and consultative                 |
| Allocation                 | Roles                                 | Responsibilities                           |
| Time frame                 | Floating, uncertain                   | Fixed, immediate                           |

This study aims to investigate the preparedness of the Banda Aceh’s dwellers by examining students at the inundated school by the 2004 tsunami. The result of this study is important to carry out further campaigns such as tsunami disaster education, contingency plan promotion, tsunami drill activities or disaster related regulations in Banda Aceh.

2. Tsunami 2004 damage map of Banda Aceh and the location of the school

Figure 1 shows the tsunami 2004 damage map of Banda Aceh and the surrounding areas [9]. The location of this study, which is SMPN 1 Banda Aceh, is also overlaid on the figure (squared black). The Figure 1 demonstrates that the school location is at devastated area. This suggested that the area of the school was highly inundated during the 2004 tsunami. Others documentation by the Japan Times [10] and Tempo [11] suggested devastated damages at the areas nearby the school, as shown in Figure 2.

3. Methodology

A simple questionnaire was developed for this study. The questionnaire includes personal data (i.e. name, address, and contact number), respondent’s basic understanding about tsunami disaster & contingency plan, and respondent preparedness. This questionnaire was used for the survey. A simple statistical analysis is employed to conclude the results from the questionnaire.

In addition to the developed questionnaire, respondents were asked to identify five independent variables associated with their preparedness: (1) school location related to the past tsunami event; (2) knowledge of contingency plan; (3) state of personal contingency plan; (4) family contingency plan; and (5) their action if any strong earthquake strike. Using a select framework, the survey data were examined to determine the current state of the student’s disaster preparedness. Additionally, the combined effect of risk perception and action on preparedness were also be examined.
Figure 1. Tsunami 2004 damage map at Banda Aceh and the surrounding areas [9] incorporated the school location (SMPN 1 Banda Aceh-Indonesia).

Figure 2. Damages at nearby the school a documentation by the (a) Japan Times [10] and (b) Tempo [11]

4. Results and discussions
Currently, 31 respondents have been interviewed (Table 2). According to the survey, some students at Banda Aceh do have a contingency plan for the next strike, some students decided on the spot, and the remainders don’t even have a neither emergency nor contingency plan at all. When explaining their plan, they used words such as run, go, high buildings, safe areas/locations. Some respondents are also
They all aware that they are located an inundated tsunami area. Based on the data as shown in Table 2, a further analysis was carried out to identify whether a contingency plan have been put in a least family level. The results are presented in Table 3.

Table 2. Results of the interview

| No.  | Name            | Do you know that our school is at tsunami inundated area? | Do you know contingency plan? | Is any contingency plan in your family? | What will you do if any strong earthquake strike? |
|------|-----------------|----------------------------------------------------------|--------------------------------|----------------------------------------|--------------------------------------------------|
| 1    | Respondent 01   | 1                                                         | Yes                            | Yes                                    | Run to high building, no wait                     |
| 2    | Respondent 02   | 1                                                         | 0                              | 0                                      | Go out of the house, go to open space             |
| 3    | Respondent 03   | 1                                                         | 0                              | 1                                      | Go to the Tsunami Building\(^a\)                  |
| 4    | Respondent 04   | 1                                                         | 0                              | 0                                      | Run to the school gate                            |
| 5    | Respondent 05   | 1                                                         | 0                              | 1                                      | Run to a higher building                          |
| 6    | Respondent 06   | 1                                                         | 0                              | 1                                      | Run to go to Neusu\(^b\)                          |
| 7    | Respondent 07   | 1                                                         | 0                              | 1                                      | Go to Museum Tsunami or higher building           |
| 8    | Respondent 08   | 1                                                         | 0                              | 1                                      | Go to Masjid Raya\(^c\) or higher building       |
| 9    | Respondent 09   | 1                                                         | 0                              | 1                                      | Go to open field or go to higher building         |
| 10   | Respondent 10   | 1                                                         | 0                              | 1                                      | Go to open field or go to higher building         |
| 11   | Respondent 11   | 1                                                         | 0                              | 1                                      | Run to Lambero\(^d\), as the place is free flood |
| 12   | Respondent 12   | 1                                                         | 0                              | 1                                      | Go to Mata Ie\(^b\)                               |
| 13   | Respondent 13   | 1                                                         | 0                              | 1                                      | Go to higher building                             |
| 14   | Respondent 14   | 1                                                         | 0                              | 1                                      | Go to higher building/place                        |
| 15   | Respondent 15   | 1                                                         | 0                              | 1                                      | Run to Blang Padang\(^d\)                         |
| 16   | Respondent 16   | 1                                                         | 0                              | 1                                      | Go to Museum Tsunami or higher building           |
| 17   | Respondent 17   | 1                                                         | 0                              | 1                                      | Go to Masjid Raya\(^c\)                          |
| 18   | Respondent 18   | 1                                                         | 0                              | 1                                      | Go to Museum Tsunami\(^a\)                        |
| 19   | Respondent 19   | 1                                                         | 0                              | 1                                      | Following the school’s order                      |
| 20   | Respondent 20   | 1                                                         | 0                              | 1                                      | Following the school’s order                      |
| 21   | Respondent 21   | 1                                                         | 0                              | 1                                      | Go to Museum Tsunami\(^a\)                        |
| 22   | Respondent 22   | 1                                                         | 0                              | 1                                      | Go to Neusu\(^b\) and go to cousin’s house       |
| 23   | Respondent 23   | 1                                                         | 0                              | 0                                      | Nothing                                          |
| 24   | Respondent 24   | 1                                                         | 0                              | 1                                      | Nothing                                          |
| 25   | Respondent 25   | 1                                                         | 0                              | 1                                      | Go to places with many people                    |
| 26   | Respondent 26   | 1                                                         | 0                              | 1                                      | Go to Pasar Aceh\(^b\)                           |
| 27   | Respondent 27   | 1                                                         | 0                              | 1                                      | Go to Museum Tsunami\(^a\)                        |
| 28   | Respondent 28   | 1                                                         | 0                              | 1                                      | Go to Museum Tsunami\(^a\)                        |
| 29   | Respondent 29   | 1                                                         | 0                              | 1                                      | Go to Museum Tsunami\(^a\)                        |
| 30   | Respondent 30   | 1                                                         | 0                              | 1                                      | Nothing                                          |
| 31   | Respondent 31   | 1                                                         | 0                              | 1                                      | Walk home via Neusu\(^b\)                         |

\(^a\) Tsunami Building or Museum Tsunami is one of escape buildings in Banda Aceh.

\(^b\) Neusu, Lambaro, Mata Ie are unaffected tsunami places during the past 2004 event.

\(^c\) Masjid Raya is considered as safe places during the past 2004 event.

\(^d\) Blang Padang and Pasar Aceh are considered as unsafe places during the past 2004 event.
Table 3. Interpreted results

| No. | Name               | What will you do if any strong earthquake strike? | Emergency plan | Contingency plan | No plan |
|-----|--------------------|-----------------------------------------------|----------------|------------------|---------|
| 1   | Respondent 01     | Run to high building, no wait                 |                |                  | x       |
| 2   | Respondent 02     | Go out of the house, go to open space         | x              |                  |         |
| 3   | Respondent 03     | Go to the tsunami building                    |                |                  |         |
| 4   | Respondent 04     | Run to the school gate                        |                |                  | x       |
| 5   | Respondent 05     | Run to a higher building                      |                |                  | x       |
| 6   | Respondent 06     | Run to go to Neusu                           |                |                  |         |
| 7   | Respondent 07     | Go to Museum Tsunami or higher building       |                |                  | x       |
| 8   | Respondent 08     | Go to Masjid Raya or higher building          |                |                  |         |
| 9   | Respondent 09     | If earthq. go to open field, if tsunami go to higher building | x       |
| 10  | Respondent 10     | If earthq. go to open field, if tsunami go to higher building | x       |
| 11  | Respondent 11     | Run to Lambaro, as the place is free flood    |                |                  | x       |
| 12  | Respondent 12     | Go to Mata le                                 |                |                  | x       |
| 13  | Respondent 13     | Go to higher building                         |                |                  | x       |
| 14  | Respondent 14     | Go to higher building/place                   |                |                  | x       |
| 15  | Respondent 15     | Run to Blang Padang                          |                |                  | x       |
| 16  | Respondent 16     | Go to Museum Tsunami or higher building       |                |                  | x       |
| 17  | Respondent 17     | Go to masjid                                  |                |                  | x       |
| 18  | Respondent 18     | Go to Museum Tsunami                         |                |                  | x       |
| 19  | Respondent 19     | Following the school's order                 |                |                  | x       |
| 20  | Respondent 20     | Following the school's order                 |                |                  | x       |
| 21  | Respondent 21     | Go to Museum Tsunami                         |                |                  | x       |
| 22  | Respondent 22     | Go to Neusu and go to cousin's house          |                |                  |         |
| 23  | Respondent 23     | Nothing                                      |                |                  | x       |
| 24  | Respondent 24     | Nothing                                      |                |                  | x       |
| 25  | Respondent 25     | Go to places with many people                |                |                  | x       |
| 26  | Respondent 26     | Go to pasar Aceh                             |                |                  | x       |
| 27  | Respondent 27     | Go to Museum Tsunami                         |                |                  | x       |
| 28  | Respondent 28     | Go to Museum Tsunami                         |                |                  | x       |
| 29  | Respondent 29     | Go to Museum Tsunami                         |                |                  | x       |
| 30  | Respondent 30     | Nothing                                      |                |                  | x       |
| 31  | Respondent 31     | Walk home via Neusu                          |                |                  | x       |

The Table 3 is developed based on the descriptive evaluation of the respondent actions if any seismic strike. The classification is based on the [8] as shown in Table 1. This analysis results suggest that most of respondents (74%) have an emergency plan and only 10% of the respondents do applied a (family) contingency plan. The shocking results are 16% of the respondents with no plan at all, even though they know that they are living at the tsunami’s affected area.
5. Conclusion

Tsunami disaster will happen again someday. Both emergency and contingency plan play a huge role to save life especially for Banda Aceh city’s dweller. This study attempts to investigates the Banda Aceh citizen’s preparedness due to tsunami disaster by interviewing students at tsunami 2004 affected school. At the current stage, various responses have been observed. The result of this study shows further campaigns in the tsunami disaster preparedness are essential to be warranted. It is also recommended that further studies should be conducted to community preparedness to broaden the researcher’s survey base and strengthen statistical reliability.

6. References

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