# ORIGINAL ARTICLE

# Disaster Preparedness: Knowledge, Attitude, and Practice Among Rural Communities in Indonesia: A Cross Sectional Survey

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#### ABSTRACT

Introduction: Disaster preparedness is strongly influenced by several factors, one of which is knowledge of disaster risks and disaster management. Lack of knowledge and readiness can affect poor performance when providing disaster management. Methods: A cross-sectional descriptive design was used for this study. The inclusion criteria were age over 18 years old, able to read and write in Bahasa Indonesia and agreed to participate. Convenient sampling technique was employed to select participants. They surveyed the knowledge, attitude and practices (KAPs) of disaster preparedness. Linear regression with enter mode was used to examine factors associated with practices. **Results:** The response rate was 83.3 (250 of 500). The majority were females (72.8%), aged 18–42 years (mean age ± SD, 32.65 ± 5.83 years), 60% married, 50.4% graduated from senior high school, and 56% employed. The total score for knowledge was 3.05 (1 to 5), attitude was 2.92 (1 to 5), and practice was 2.92 (1 to 5); indicating that low knowledge, attitude, and practices towards disaster preparedness. Education level (B= 1.98, SE=0.15), working status (B= 1.35, SE=0.43), attending disaster training (B= 2.12, SE=1.16), higher knowledge (B= 3.26, SE=1.35), and positive attitude (B= 2.10, SE=0.75) was the factor associated with practices disaster preparedness among rural communities (p<0.05). Conclusion: This issue emphasizes the fact that, despite being one of the first countries to establish a national committee for natural disaster and an awareness campaign, information has not been translated into effective attitudes and appropriate practice.

Keywords: Disaster Preparedness, Knowledge, Attitude, Practice.

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## INTRODUCTION

Indonesia is vulnerable a country to disasters, located in the Pacific Ring of Fire (an area with a lot of tectonic activity) at risk of volcanic eruptions, earthquakes, floods and tsunamis (1). In 2020, there were 525 disasters in Indonesia, consisting of 179 whirlwinds, 153 floods, 149 landslides, 14 forest and land fires, 12 combinations of flood and landslides; seven tidal waves and abrasion, 11 destructive earthquakes, and two volcanic eruptions (1). The most of common disasters occurred in Indonesia was natural disasters and only around 20% were manmade disaster (1). Almost all major cities in Indonesia are in coastal areas. Various activities ranging from settlement, trade, transportation, industrial development and various other sectors are crammed into this region. It is estimated that 60% of Indonesia's population and 80% of industrial locations are in coastal areas (1).

Activities aimed towards disaster preparedness attempt to save as many lives and livelihoods as possible in the event of a disaster, allowing the afflicted community to quickly return to normalcy (2). Individuals must be able to be mobilized during an evacuation or have sufficient supplies to shelter-in-place until the situation has passed, and communities must be prepared to respond in either of these scenarios in the event of an emergency (3). Beliefs and perspectives on preparedness differ according to individuals' histories, the dangers they've faced, and the circumstances they're in currently. In light of the fact that a person's confidence in their own ability to prepare may not convert into actual readiness behavior, it may be required to increase people's ability to adopt preventive preparedness measures (4). Traditional disaster preparedness campaigns have centered on encouraging personal or household preparedness practices to ensure a safe response and speedy recovery (4). Emergency supply kits, disaster plans, and knowledge of local risks have all been stressed in public education campaigns. As a result, most of the literature on readiness has concentrated on the motivations that motivate these actions in particular individuals (5).

Disaster preparedness is strongly influenced by several factors, one of which is knowledge of disaster risks and disaster management (6). Preparedness activities should be based on knowledge of the potential impacts of disaster hazards in health and safety (7). Lack of knowledge and readiness can affect poor performance when providing disaster management (8). Knowledge, attitude, and practice (KAP), components of people's public health emergency response capability, have been highlighted as crucial in halting the spread of an epidemic by a number of studies (9,10). People's adherence to preventative and control measures is influenced by KAP, which has implications for the design and implementation of health promotion and prevention initiatives (9). Knowing the public's starting point in terms of knowledge allows us to target education efforts, pinpoint subsets of the population with low KAP, and set the record straight.

Previous study conducted in Aceh found that the proportions of people with good knowledge of disaster and disaster preparedness were quite low (11). Another study conducted in Among those polled in Tehran, 31.4% demonstrated a lack of awareness about how to be safe in the event of an earthquake. In that survey, 31.4 percent of respondents had "moderate" levels of knowledge, while 37.2% had "suitable" levels (12). Other study in Beijing reported that people's disaster response knowledge in Beijing was low, especially regarding human- made disasters (13). The emphasis of catastrophe preparedness and prevention initiatives has changed from individual preparation to community resilience (4). When disasters become more and more severe, the important role of communities and individuals in emergency preparedness for public health has gained prominence in society (4). Therefore, it's required to improve capacity and participatory of community on disaster management and preparedness by involving them into the contextual role. However, research examining community members' disaster management knowledge, attitude, and preparedness in Indonesia's high-risk areas is scant. The purpose of this research was to assess the level of disaster preparedness education, awareness, and practice in Indonesian communities.

#### MATERIALS AND METHODS

#### Study design

A cross-sectional descriptive design was used for this study, which was conducted from May to September 2021. This study was undertaken in coastal regencies in Banten province, specifically Serang and Pandeglang, which are geographically next to the Indian Ocean and have been designated as Indonesia's tsunami danger zone (number IV/085/ KE.UF/2021). Tanjung Lesung, Serang was affected by tsunamis in 1883 and 2018 as a result of Mount Krakatau's eruption. Earthquakes and tsunamis pose a significant hazard to Banten Province's west coast, with a tsunami wave travel period of 30-45 minutes (1).

#### Sample

The inclusion criteria were age over 18 years old, able to read and write in Bahasa Indonesia, and agreed to participate. G\*Power 3.1.1 software was used to estimate the sample size of the study with the assumption of F test, power level 0.80, alpha 0.05, and effect size 0.15. The minimum sample should be recruited was 127. Convenient sampling technique was employed to select participants.

#### Instrument

Demographic data includes age, gender, marital status, education level, working status, and attaining training of disaster.

The research instruments utilized were questionnaires. Knowledge, attitude, and behaviors (KAPs) in the area of disaster preparedness were surveyed. The questionnaire was divided into four parts: demographic data, an earthquake preparedness knowledge exam (consisting of 14 questions), an attitude survey (with 10 guestions), and a self-evaluation of how well the respondent handles emergency scenarios including earthquakes (14-item). Three professionals familiar with both earthquake preparedness the evaluation of KAPs and questionnaires double-checked and confirmed the data collected in each survey. The research instrument had a high index of item-objective congruence (0.95). Furthermore, the Cronbach's Alpha for levels of knowledge, attitudes, and practices were 0.83, 0.75, and 0.75, respectively (7). In the current study, the Cronbach's Alpha of knowledge, attitude, and practices were 0.763, 0.736 and 0.760, respectively (Table II).

### Procedure

Permission to conduct a study was obtained from the faculty of health science of Lincoln University before data collection. The consent process involved the following steps after receiving approval and legal clean-up: all participants received informed consent to participate by signing or verbal agreement. Participants were encouraged to keep their own copies of the form of consent. Participants have been told at any time of their right to withdraw from the study. Participants were told of the possibility of sharing and/or releasing the findings of this study and their direct quotes. Nevertheless, no details could be included in the presentations that could classify participants in presentations and/or publications of the study findings. To order to maintain confidentiality and anonymity of topics, researchers and RA complied with regulations. An incentive of Rp 25,000,00 was offered to those who completed survey questionnaires.

## Data analysis

A descriptive statistic was used to describe variable interest using mean and standard deviation for continuous variables and frequency distribution for categoric data. The Pearson correlation coefficient was calculated to determine the correlation between continuous variables. The data were subjected to chi square test to find any association between categoric data with continuous data. We utilized independent sample t tests for dichotomous variables and 1-way ANOVA for ordinal variables to find significant differences between mean scores for practices. Linear regression with enter mode was used to examine factors associated with practices. All correlation or differences were deemed statistically significant at p < 0.05. Statistical analysis was performed using SPSS (version 23).

# RESULTS

The response rate was 83.3 (250 of 500); Education level (p=0.4), gender (p=0.3), and mean age (p=0.5) were not found to be statistically significant differences between respondents and non-respondents. The majority were females (72.8%), aged 18–42 years (mean age  $\pm$  SD, 32.65  $\pm$  5.83years), 60% married, 50.4% graduated from senior high school, and 56% employed. There was significant relationship between gender, education level, working status, and attaining training of disaster with practice toward disaster preparedness (Table I).

The total score for knowledge was 3.05 (1–5), indicating that the knowledge of the rural communities towards disaster preparedness was moderate. The total score for attitude was 2.92 (1–5), indicating that the attitude of the rural communities towards disaster preparedness was low. While, the

total score for practice was 2.92 (1–5), indicating that the practice of the rural communities towards disaster preparedness was poor.

More than 94% of respondents to this survey said their community was aware of the information that "people should run away from houses when an earthquake occurs," followed by the information that "earthquake occurrence can be predicted" and the information that "an earthquake damages houses, streets, water supply, and electricity" (Table III). The vast majority of people surveyed reported agreeing or strongly agreeing with the statements "after an earthquake and tsunami, you should check your family members" (98.82%), "a good earthquake and tsunami preparedness plan reduces earthquake effects" (96.47%), and "during an earthquake and tsunami, you should first take care of yourself before helping others" (98.82%). (Table IV). In addition, 96.475% of them "always have a flashlight at home and never forget its place," "Consult and plan with family about the responsibility and shelter for survival in case of earthquake and tsunami," and "always have"

In the multivariable analysis, we found that, after adjusting for all cofounders in the final model, education level (B= 1.98, SE=0.15), working status (B= 1.35, SE=0.43), attending disaster training (B= 2.12, SE=1.16), higher knowledge (B= 3.26, SE=1.35), and positive attitude (B= 2.10, SE=0.75) was the factor associated with practices disaster preparedness among rural communities in Indonesia (p<0.05) (Table 6).

# DISCUSSION

Participants in our study had a modest level of knowledge. Previous study indicates a need to enhance social readiness for and awareness of disaster management (14,15). Having a low literacy level was found to be a strong predictor of societal unpreparedness (16). Since the tsunami attack in Indonesia, People have been educated about earthquake and tsunami safety from many different angles and through many different mediums. This taught us that the government or social media should better promote the spread of other knowledge and strategies for responding to public health emergencies, so increasing people's preparedness to deal with them in their entirety. People's primary sources of information are still television and the internet. However, there is some false and unverified information online, so these sources may occasionally mislead people (17-19). In light of the fact that our community members come from a wide range of educational backgrounds and may not always be able to tell fact from fiction, it is imperative that organizations like the government, the Red Cross,

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| Table I | : | Demographic | characteristics | (n=250) |
|---------|---|-------------|-----------------|---------|
|---------|---|-------------|-----------------|---------|

| Variables                      | n=250 (%)  | Practice score   | r or t or F | p-value |
|--------------------------------|------------|------------------|-------------|---------|
|                                |            | Mean ± SD        |             |         |
| Age, year (Mean $\pm$ SD)      |            | $32.65 \pm 5.83$ | 0.212       | 0.439   |
| Range                          | (18-42)    |                  |             |         |
| Gender                         |            |                  |             |         |
| Male                           | 68 (27.2)  | 2.11±1.07        | 2.643       | 0.029   |
| Female                         | 182 (72.8) | 3.32±0.68        |             |         |
| Marital status                 |            |                  |             |         |
| Married                        | 150 (60.0) | 2.56±0.71        | 0.451       | 0.625   |
| Single/Divorce/Widow           | 100 (40.0) | 2.19±0.56        |             |         |
| Education level                |            |                  |             |         |
| Below junior high school       | 116 (46.4) | 2.54±60.87       | 2.603       | 0.024   |
| Senior high school             | 126 (50.4) | 2.73±1.15        |             |         |
| University                     | 8 (3.2)    | 3.81±1.68        |             |         |
| Working status                 |            |                  |             |         |
| Employed                       | 140 (56.0) | 2.19±0.31        | 2.401       | 0.012   |
| Unemployed                     | 110 (44.0) | 3.11±1.06        |             |         |
| Attaining training of disaster |            |                  |             |         |
| Yes                            | 50 (20.0)  | 3.45±2.32        | 3.176       | 0.001   |
| No                             | 200 (80.0) | 2.11±1.46        |             |         |

# Table II : Knowledge, Attitude, dan Practices toward disaster preparedness among rural communities

# in Indonesia

| Variable  | Mean ± SD  | Range | Cronbach' Alpha |
|-----------|------------|-------|-----------------|
| Knowledge | 3.05 ±1.11 | 1-5   | 0.763           |
| Attitude  | 2.92±0.55  | 1-5   | 0.736           |
| Practice  | 2.43±0.73  | 1-5   | 0.760           |

| Items  | Percentage of answering as true |
|--|---------------------------------|
|  | (%)                             |
| People should run away from houses when an earthquake occurs                                   | 94.4                            |
| Earthquake occurrence can be predictable   | 94.4                            |
| An earthquake damage houses, streets, water supply and electricity                             | 94.4                            |
| A tsunami has not yet been verified but could exist and may be as little as an hour away       | 95.5                            |
| People should stay away from mirrors or glass ornaments or furniture when an earthquake occurs | 92.5                            |

# Table III : Top 5 knowledge toward disaster preparedness among rural communities in Indonesia

# Table IV : Top 5 attitude toward disaster preparedness among rural communities in Indonesia

| Items  | Percentage of answering as 'agreed<br>and strongly agreed' |  |
|--|--|--|
|  | (%)  |  |
| During an earthquake and tsunami, you should first take care of yourself before helping others                               | 98.82  |  |
| After the earthquake and tsunami, you should check your family members   | 98.82  |  |
| A good earthquake and tsunami preparedness plan reduces earthquake effects   | 96.47  |  |
| Governmental organizations should prepare clean water and sufficient food for the population after an earthquake and tsunami | 96.47  |  |
| Participating in earthquake and tsunami drills could make you practice safety when an earthquake occurs                      | 96.47  |  |

# Table V : Top 5 practices toward disaster preparedness among rural communities in Indonesia

| Items   | Percentage of answering as always |  |  |
|---|-----------------------------------|--|--|
|   | (%)                               |  |  |
| Obtain information about earthquake and tsunami preparedness from your local organization                 | 96.47                             |  |  |
| Always have a flashlight at home and never forget its place   | 96.47                             |  |  |
| Consult and plan with family about the duty and shelter for survival in case of an earthquake and tsunami | 96.47                             |  |  |
| Have an emergency bag which contains essential stuff such as food and a torch                             | 95.29                             |  |  |
| Tsunamis can travel at speeds of about 500 miles or 805 kilometers an hour, almost as fast as a jet plane | 96.47                             |  |  |

| Variable  | B (SE)      | 95% CI      | p-value |
|---|-------------|-------------|---------|
| Gender (male vs female)                           | 0.79 (0.49) | 0.74 –2.15  | 0.095   |
| Education level (elementary school as references) | 1.98 (0.15) | 1.07 –3.45  | 0.003   |
| Working status (employed vs unemployed)           | 1.35 (0.43) | 1.10 – 4.18 | 0.005   |
| Attending training (no vs yes)                    | 2.12 (1.16) | 1.33 – 5.45 | 0.001   |
| Knowledge   | 3.26 (1.35) | 1.51 – 5.82 | 0.001   |
| Attitude  | 2.10 (0.75) | 1.27-4.19   | 0.006   |

| Table VI : Multiple regression of factors associated | with practice towards | disaster preparedness among |
|--|-----------------------|-----------------------------|
| rural communities in Indonesia (n=250)               |                       |                             |

hospitals, and even schools take on a greater role in health education and the dissemination and teaching of correct emergency knowledge and skills. Mass media outlets should monitor public sentiment during national emergencies and avoid undermining efforts to contain and mitigate crises by spreading false or misleading information, as well as by making inappropriate comments or sensationalizing facts (20).

The majority of participants indicated a negative attitude about disaster preparedness. The catastrophe committee may need to concentrate on changing community attitudes in order to be realistic. The considerable positive connection between disaster preparedness knowledge and attitude suggests that positive knowledge results in a favorable attitude. Training aimed at increasing societal awareness may be important to foster a positive attitude and behavioral disposition. Behaviors related to community planning readiness were also evaluated. These included things like signing up for county emergency alert messages, telling friends and neighbors to do the same, and having a CPR and first aid certified family member or friend on hand. Adoption of 11 or more of the 21 measures considered high for family readiness (having 16 emergency kit items, having a written emergency household plan, and participating in the four community preparedness behaviors).

Interventions aimed at improving society's disaster preparedness should focus on the study's identified primary predictors, including education, employment status, history of disaster training, and disaster preparedness knowledge and attitude. Education level, disaster training, and employment position can all help communities enhance their readiness for

disaster management (21) Participants with a higher level of education are better prepared to manage disasters (22,23) individuals who had previously attended disaster training reported feeling more confident and equipped to deal with the aftermath of a disaster situation (24). Participants' employment status may enable them to learn additional catastrophe experience, knowledge, and skills (25). Future research should use an experimental design to assess how well disaster education programs improve participant knowledge, attitudes, and skills. In order to corroborate these findings in future investigations, the sample size and the spectrum of participants need be broadened even more. Finally, exploring participants' experiences, barriers, and learning needs can assist create effective training and practice interventions.

Our study had certain limitations. First, we employed a self-administered questionnaire, which is prone to bias. Second, we excluded socioeconomic variables like money or pay as determinants of disaster preparedness activities since they were undesired in our cultural setting.

# CONCLUSION

Our research showed that communities scored poorly on measures of knowledge, attitude, and practice related to disaster preparedness. Although the country was ahead of the curve in terms of setting up a national committee for natural disasters and an awareness campaign, this issue highlights the fact that this knowledge has not yet been put into practice. To meet these goals, we believe it is crucial that public health practitioners place an emphasis on education and bring together the activities of many different sectors into a unified interdisciplinary plan. More research is needed to analyze the influence of new variables including individuals' and communities' empowerment and social media networks, but our findings may be valuable to policymakers.

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