Psychological Preparedness of Disaster Teacher in Small Volcanic Island: A Mixed Methods Study

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Abstract. This mixed methods research explores the psychological disaster preparedness of preschool teachers on one of Eastern Indonesia's small volcanic islands, Ternate. This study used a concurrent parallel designs approach. Quantitative research uses the Prepared Tool scale and will use descriptive statistical methods, helping to determine the profile of psychological preparedness for disasters of preschool teachers (N = 96). At the same time, the qualitative research involved the same participants with two open-ended questions. The questions aimed to find the factors of psychological disaster preparedness of Gamalama's volcanoes in early childhood teachers. Data was collected online using a Google Form distributed using the Whats App. The qualitative data obtained was analyzed thematically with MAXQDA 2024. A quantitative study using the PREPARED tool found a preschool teachers' psychological preparedness profile categorization is low at 3,12%, medium at 58,34%, and high at 38,54%. The result of t h e qualitative study has five themes physical preparedness, mental preparedness, knowledge mitigation, and religiosity. Limitations of this mixed methods study and suggestions for future research are discussed.

Keywords: disaster, preschool teachers, psychological preparedness, small volcanic island

1 Introduction

Based on the Indonesia Disaster Risk Index (IRBI) 2022, North Maluku has a high-risk class with a 149.22 (high) value. The existing hazards in Ternate City are earthquakes, tsunamis, floods, volcanic eruptions, landslides, forest and land fires, drought, extreme waves, abrasion, and extreme weather. More than 500,000 people were affected by 2,573 natural disasters in Indonesia in 2018, resulting in 4,800 deaths and missing persons (BNPB website). Currently, Indonesia faces an ongoing risk of natural disasters due to its location within the Ring of Fire, tropical geology, and the convergence of three tectonic plates.

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The Disaster Risk Reduction (DRR) initiative neglects the small islands of Indonesia, particularly in the Eastern region[1]. There are many reasons why improving community resilience in small islands requires special attention. Islands differ from mainland areas in size, resources, and environmental conditions[2], [3], [4].

Disasters have the most significant impact on vulnerable groups, especially children [5]. Children directly experience, feel, and witness the impact caused by the age factor, but they are still immature regarding psychological growth. Several research studies [6] show that about fifty percent of disaster victims are children. The disasters impact the physical, psychological, and social dimensions of children. A significant number of children experience death, injuries, and homelessness [7]. Psychological problems following disasters are often overlooked due to their rapid onset and long duration[8]. Hence, we should create a conducive environment to help children recover from psychological problems stemming from disasters.

Schools are no less important Disaster Risk Reduction (DRR) institutions than families. Pfefferbaum et al. [9] found an increase in school-based DRR programs involving children in disaster preparedness activities. Similar research by Amri et al. [10] found that this program can help increase children's knowledge about disaster risk and preparednessHowever, Amri et al. [11] further stated that most of the research on DRR education programs was conducted in primary and secondary schools; only three out of 37 studies were conducted with preschool children.

According to Ki Hajar Dewantara, the teacher is one of the most important elements in education. In addition to teaching, the teacher is a guide, leader, and role model [12]. Elangovan & Kasi [13] summarised that providing psychological preparedness for disasters through teachers is one of the best ways to prepare children for the psychosocial consequences of disasters. Another study showed that teachers are well-positioned to provide critical support for children before and after disasters and other potentially traumatizing events [14], [15]. The intensive cooperation between parents and educators can help children's development [16]. Based on this explanation, the researcher assumes a need for a disaster preparedness service designed specifically for the immediate child development environment at school.

Ternate is one of Indonesia's disaster-prone small islands. The population was Ternate 205,870 in 2021[17] The population is increasing by approximately 15,000 annually and is projected to attain over 210,000 by 2030. Ternate, as a small island, is notable for its geomorphological characteristics. As stated by Faral et al. [18], the components of Ternate Island result from volcanic activity or subaerial deposition, and physical geography is characterized by mountainous features [19], [20]. This island features three lakes that were formed by volcanic eruptions [21], [22]. Presented below is a map of Ternate Island (Figure 1).

Ternate is ranked 17th in the national catastrophe vulnerability assessment, with a risk score of 160.4 (high risk) and a potentially exposed population comprising 63% of Ternate City's total population[23]. Geological hazards, including earthquakes and tsunamis, have transpired historically and are anticipated to manifest in the future. The eruption of Mount Gamalama is a volcanic threat to this region [24]. Consequently, Ternate City is classified as having a high level of vulnerability[23]. Nonetheless, Ternate City's significant vulnerability is not matched by community preparedness. A cross-sectional study revealed that the majority

(77%) families polled in Ternate City reported a lack of knowledge regarding disaster management [25].

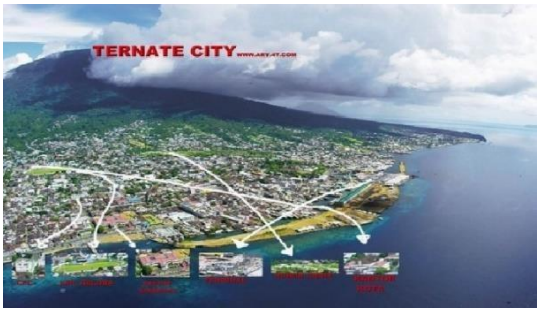

Figure 1. Map of Ternate Island

The community's and government's capacity to manage disasters is largely contingent upon their comprehension of preparedness. Community preparedness is crucial in mitigating catastrophe risk and enhancing resilience to diverse natural and anthropogenic disasters[26]. Consequently, this study seeks to (1) assess the level of disaster knowledge among parents on Ternate Island, (2) evaluate parents' comprehension of preparedness for the Gamalama volcano disaster on Ternate Island, and (3) analyze parental experiences regarding preparedness for the Gamalama volcano disaster.

Psychological preparedness is an important aspect of mitigating stress and trauma as well as emotions during disasters such as fear, loss of sense of control, and coping with changing conditions[27][28], [29]). Psychological preparedness is important for school educators, especially early childhood education centers (Kurniati, 2003). Similarly, Clode[30] and Paton

[31] added that this aspect underlies physical and material readiness, which is one of the disaster survival plans. Reser argues that psychological preparedness is an important aspect of mitigating post-traumatic stress due to disasters such as cyclones, as well as emotions felt at the time of disaster events, such as fear, loss of control, and worry. As an earlier researcher of disaster psychological preparedness, Morrissey and Reser[27] defined disaster psychological preparedness as a state of intra-individual and psychological awareness, anticipation, and readiness to anticipate and manage one's psychological responses in emergencies.

2 Methods

2.1 Research design

This study used a mixed methods approach with a convergent parallel design, which is a way of collecting quantitative and qualitative data and then using them simultaneously to understand the problem in the research [32]. A mixed method uses a reporting approach to present all qualitative and quantitative data integration in one matrix [33]. This research was divided into a quantitative and a qualitative phase, intended to answer the research questions. The procedural diagram of the combined research can be seen in Figure 2.

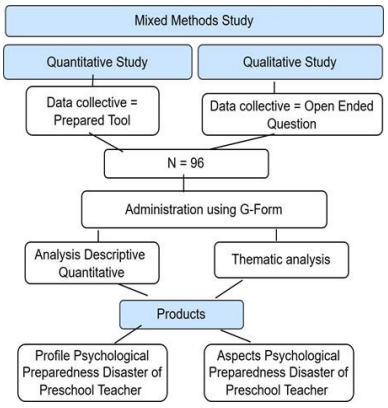

Figure 2. Procedural Diagram of Mix Methods

3 Results

3.1 Quantitative Study

This quantitative study used a survey approach and the PREPARED Tool [34] to measure the level of psychological disaster preparedness of preschool teachers at Ternate. This instrument is a questionnaire comprising 41 statement items with Yes and No answer options. Validity of the PREPARED Tool based on Confirmatory Factor Analysis (CFA) and Multi-group Confirmatory Factor Analysis (MG-CFA) tests found that the PREPARED instrument showed the multidimensional structure model had a good model fit index value (CFI=0.986; TLI=0.983; RMSEA=0.031) [35]. MG-CFA results show that there is measurement invariance at the configural to strict invariance level for gender groups, age groups, and non-risk/at-risk groups. Reliability of the PREPARED Tool was high with an Omega McDonald reliability coefficient of 0.912 and Cronbach's Alpha of 0.898. However, according to Boone & Staver [36], a set of items with an Alpha Cronbach value of 0.60 and above is considered good and acceptable as a research instrument. Table 1 shows the score of the level of psychological preparedness to face disasters on the Prepared Tool.

Table 1. Norm of Prepared Tool

Categorize	Norm
Very Low	0-3
Low	4-18
Middle	19-33
High	34-46
Very High	>46

The results of the distribution of psychological disaster preparedness scores show that 56 people, or 58.34% of the respondents, are in the medium category. This is followed by the high category (N=37; 38.54%). There are, however, 3 preschool teachers in the low psychological preparedness category (N=3; 3.12%). The analysis also noted no participants in the category of very low psychological preparedness.

3.2 Qualitative Study

Five themes resulted from data analysis. Each of the themes is illustrated as follows in figure 2 below:

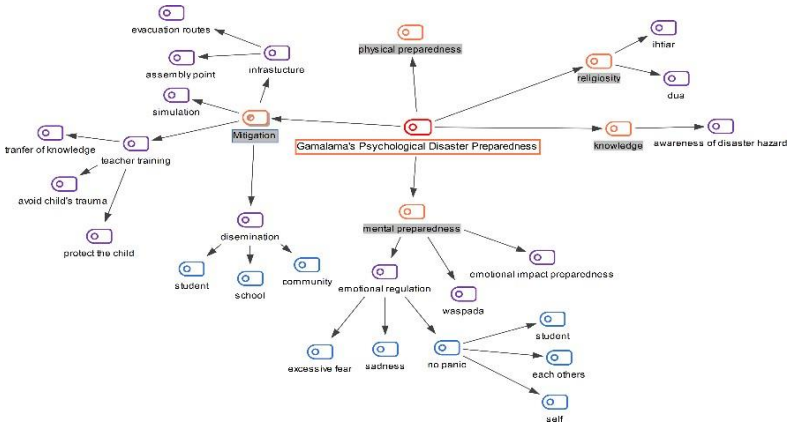

Figure 2. Themes of Preschool Teacher Disaster Psychological Preparedness

3.2.1 Physical Preparedness

The theme was reported by three respondents and was found to coincide with natural mental preparedness for disasters. Similarly, Paton [31] stated that disaster preparedness consists of physical, material, and psychological, and the three are interconnected. Improving psychological preparedness will enable individuals to adjust to the effects of disasters effectively. Unfortunately, disaster preparedness is still focused on physical preparedness, such as buildings having strong structures and evacuation routes, food, medicine, and first aid [41], [42]. So to optimize it, disaster preparedness needs to be led by multi-sectors, the role of government and stakeholders, individuals, families, communities, and other organizations [43].

3.2.2 Religiosity

The theme of religiosity was found in the analysis 15 times. The religiosity theme is quite relevant to Ternate Island. That is because Ternate has a society that still upholds local cultural customs. The community's tradition is called the Segulaha tradition, which reflects the integration of religious values, especially Islam[44]. Ternate City is one of the oldest Islamic kingdoms in Indonesia, and it still survives to this day [45]. Historically, the Portuguese entered Ternate in 1511; the purpose was to take spices and broadcast and develop Christianity at the same time [44]. It shows that religiously, not only one religion influenced the culture on Ternate Island, but other religions also played a role in developing the Segulaha custom.

3.2.3 Knowledge

The Knowledge theme was found in as many as eight codes. The disaster knowledge from the thematic analysis results consists of knowledge of disaster signs that will increase awareness of potential disasters. Based on LIPI-UNESCO/ISDR [46], knowledge is the most significant consideration in decision-making. Families and individuals need to know the causes of hazardous disasters to cope with them, such as adequate self-care during a disaster and an understanding of proper self-rescue during disaster preparedness. The research of Tuladhar et al. [47] states that disaster impact knowledge is an important thing for communities to know, as it can lead communities and people to greater preparedness for disaster risk reduction processes. What was conveyed by Wang [48] is that schools, in this case, can disseminate information in the form of policies, curricula, media, and learning activities regarding disaster management to the wider community. The teachers are one part of the school system that can increase the knowledge of their students.

3.2.4 Mental Preparedness

This study found that the theme of mental preparedness was the most prevalent coding in this study. There were 76 occurrences. The subthemes that emerged were controlling emotions, reducing the impact of emotions, and being vigilant. In the sub-theme of emotion regulation, researchers also found the ability to regulate the emotions of self, others, and students at school. The emotions that are expected to be regulated are fear, anxiety, sadness, and panic. According to Morrissey and Reser[27], anxiety experienced during disaster situations is part of psychological preparedness, which includes the ability to anticipate and manage emotional responses in emergencies. This is further supported by Paton [29], who states that psychological preparedness is an important element in reducing the psychological impact of disasters. The several emotions that appear in the coding of this theme indicate that they need to have special skills in managing emotional responses to stay calm and focused during risky disaster situations. Similar to the research conducted by Elangovan and Kasi [13], providing psychological preparedness for disasters through teachers is one of the best ways to prepare children for the psychosocial consequences of disasters. Another study showed that teachers are well-positioned to provide critical support for children before and after disasters and other potentially traumatizing events [14], [15]. This supports the findings of Boylan & Lawrence [49] and Dhillon & Sasidharan [50], which state that psychological disaster training is important in improving teachers' readiness to assist children in facing disasters

3.2.5 Mitigation

The theme of Mitigation emerged from a qualitative study on teachers' psychological preparedness for disasters. Four subthemes were identified: training, dissemination, infrastructure enhancement, and disaster simulation activities. Notably, there is a pressing need for teacher training, particularly in providing psychological support for children during disasters. This support encompasses sharing vital disaster information, ensuring the safety of children in crises, and developing skills to prevent potential trauma associated with disaster events.

4. Results

This study found that preschool teachers in Ternate Island had a psychological preparedness category of 58.34% in the medium category, high category (38.54%), and low category (3.12%). This research also found five aspects of disaster preparedness: physical preparedness, mental preparedness, knowledge, mitigation, and religiosity.

Several limitations in this study need to be considered. The first is that data collection using a qualitative open-ended survey method conducted online was less in-depth due to limited opportunities. More qualitative research using the interview method is needed to deepen the factors of psychological preparedness for disasters from the teachers' perspective. Second, open-ended survey questions are recommended to be more than one question so that the themes found can be explored more fully.

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