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Preparedness of islamic boarding school students for earthquakes and tsunamis in Pasie Nan Tigo Padang

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ABSTRACT

Many aspects affect preparedness in adolescents, one of which is the environmental conditions in which the adolescents live, such as Islamic boarding school students who live 100 meters from seashore. Since its establishment, Islamic boarding school has never received any training on earthquake and tsunami preparedness. The purpose of this research was to determine the level of preparedness of Islamic boarding school students to face the earthquakes and tsunamis in Pasie Nan Tigo Padang. This research was descriptive quantitative with a cross sectional research design. The sample in this research were Islamic boarding school students, totaling 86 students used the proportional stratified random sampling' sampling technique and met the criteria. The instrument used questionnaire of LIPI-UNESCO/ISDR (2006). Based on the results, that 60.5% of Islamic boarding school students had a moderate level of preparedness to face with earthquakes and tsunamis. Parameter of knowledge about disaster as many as 61,6% of students in the medium category, parameter of emergency planning as many as 69,8% of students in the low category, parameter of warning system as many as 66,3% of students in the low category, and parameter of resource mobilization capacity as many as 87,2% of students in the low category. It is suggested that Islamic boarding school cooperate with disaster-related agencies to conduct disaster counseling and simulations as well as facilitate existing infrastructure related to disasters.

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1. Introduction

Indonesia is situated at the convergence of major tectonic plates and several smaller ones, surrounded by three primary plates: the Eurasian Plate, the Indo-Australian Plate, and the Pacific Plate. This geographic condition makes the country highly prone to disasters such as volcanic eruptions, earthquakes, tsunamis, floods, and landslides (BNPB, 2021b). From the beginning of the year until December 20, 2021, a total of 2,941 disaster events occurred in Indonesia. These disasters affected 8,293,145 people, who either suffered or were displaced, with 656 fatalities, 14,107 injuries, and 93 people reported missing (BNPB, 2021a). Among the various potential disasters, earthquakes and tsunamis stand out as particularly impactful to human life. Data shows that Indonesia is one of the countries with the highest seismic activity globally, exceeding the seismic levels of the United States by more than tenfold.

Badan Meteorologi Klimatologi dan Geofisika (BMKG) recorded the annual frequency of earthquakes in Indonesia. Over the past two years, earthquake occurrences have decreased, from 11,515

events in 2019 to 8,264 in 2020. However, in 2021, the frequency of earthquakes rose again. BMKG noted that monthly earthquake occurrences averaged 800-900 events, with the highest frequency recorded in November at 980 earthquakes (BMKG, 2021).

Badan Penanggulangan Bencana Daerah (BPBD) reported that Padang City is situated between two earthquake fault lines, the Semangko Fault and the Megathrust Fault. Experts predict that a rupture of the Mentawai Megathrust could result in an 8.9-magnitude earthquake, followed by tsunami waves 6-10 meters high in Padang City (Banjanahor, 2020). Over a span of 12 years (2009–2021), three major earthquakes struck Padang, causing 386 fatalities, 1,219 injuries, and damage to 3,547 educational facilities. The largest earthquake occurred on September 30, 2009, with a magnitude of 7.9 on the Richter scale, resulting in 385 deaths and 1,216 injuries (DIBI, 2021).

One of the main factors contributing to the high number of casualties during disasters is the lack of community preparedness to anticipate such events (Herdwiyanti & Sudaryono, 2013; Fatma, 2017 Yanuarto et al., 2019). As stated in the Undang-Undang RI Nomor 24 Tahun 2007 Tentang Penanggulangan Bencana (2007), disaster preparedness involves a series of activities aimed at anticipating disasters through effective and efficient organization. According to LIPI-UNESCO/ISDR (2006), disaster preparedness is categorized into five parameters: knowledge and attitude, emergency planning, preparedness policies, warning systems, and resource mobilization. Preparedness is a condition in which people, both individually and in groups, have the ability to physically and psychologically deal with disasters (Rahma & Yulianti, 2020).

Disaster preparedness efforts can involve all segments of society, including adolescents. During disasters, adolescents often play a role in emergency response, assisting in rescuing lives and property (Hodge et al., 2015). According to WHO, adolescents are the population in the age range of 10-19 years, according to Peraturan Menteri Kesehatan RI Nomor 25 Tahun 2014, adolescents are the population in the age range of 10-18 years, and according to the Badan Kependudukan dan Keluarga Berencana (BKKBN) the age range of adolescents is 10-24 years and not married (Pusdatin Kemenkes RI, 2014; Hurlock, 2012; Agustina, 2006). Therefore, adolescents need to have a high level of disaster preparedness (Purwoko et al., 2015). This aligns with the findings of Salasa et al. (2017), which demonstrate that empowering adolescent groups can enhance disaster preparedness efforts to address potential fatalities in Garut Regency. A study by Dien et al. (2015) also found that students at SMP Kristen Kakaskasen actively participated in earthquake risk reduction campaigns.

Several factors influence disaster preparedness among adolescents, one of which is the environmental conditions where they reside. This is supported by research conducted by Devica et al. 2020), which revealed that disaster preparedness among students in green zones in Padang City was relatively low compared to those in red zones. Similarly, Hamdani (2015) found that disaster preparedness at SMP Negeri 2 Imogiri Bantul, which is a disaster-resilient school, was higher than that of SMP Negeri 1 Imogiri Bantul, a non-resilient school.

Pasie Nan Tigo Village is one of the administrative areas in Padang City, West Sumatra, covering 14.57 km^2 along the coast of Sumatra, categorized as a disaster-prone area, particularly for earthquakes and tsunamis (Neflinda et al., 2019). In Pasie Nan Tigo, there is a islamic boarding school (Islamic boarding school) located just 100 meters from the shoreline. According to the islamic boarding school's caretaker, most of the 110 students, aged between 12 and 16 years, come from various cities and regencies in West Sumatra and beyond. Therefore, research is needed to assess the preparedness of islamic boarding school students in facing earthquakes and tsunamis in Pasie Nan Tigo, Padang.

2. Methods

This study employs a descriptive quantitative approach with a cross-sectional research design. The sample consists of 86 islamic boarding school students, selected using a proportional stratified random sampling technique and meeting the specified criteria. Data collection was conducted from February to March 2022. The data collection instrument used was the LIPI-UNESCO/ISDR (2006) questionnaire on students' preparedness for earthquake and tsunami disasters. The questionnaire comprises 31 questions

encompassing four parameters: disaster knowledge, emergency response planning, disaster warning systems, and resource mobilization.

The data analysis technique in this study is quantitative and involves several steps. First, the collected data is edited and coded to ensure completeness and consistency of responses, followed by assigning scores to each answer based on the predetermined scale. The scoring process evaluates the four parameters of disaster preparedness: disaster knowledge, emergency response planning, disaster warning systems, and resource mobilization. Descriptive statistical analysis is then performed to present frequency distributions, averages, percentages, and standard deviations for each parameter. Based on the total scores, the students' preparedness levels are categorized into five levels: "Very Prepared," "Prepared," "Moderately Prepared," "Less Prepared," and "Not Prepared." These categories are determined using specific interval values. The results are interpreted to assess the preparedness levels of islamic boarding school students in facing earthquakes and tsunamis. Additionally, statistical software, such as SPSS, is utilized to ensure accuracy in data processing, including tabulation and statistical calculations. The findings from the analysis provide recommendations for strategies to enhance disaster preparedness among islamic boarding school students.

3. Results and Discussion

The preparedness of islamic boarding school students in facing earthquakes and tsunamis reveals that out of 86 students, the majority have a moderate level of disaster preparedness (60.5%) (Table 1).

Table 1.
Preparedness Levels of Islamic boarding school Students in Facing Earthquakes and Tsunamis

Preparedness Level	Frequency (f)	Percentage (%)
Low	34	39.5
Moderate	52	60.5
High	0	0
Total	86	100

The preparedness level of students is determined based on four parameters: disaster knowledge, emergency response planning, disaster warning systems, and resource mobilization. The results show that most students have a moderate level of disaster knowledge (61.6%), while their levels for emergency response planning (69.8%), disaster warning systems (66.3%), and resource mobilization (87.2%) fall into the low category (Table 2).

Table 2.
Preparedness Parameters of Islamic boarding school Students in Facing Earthquakes and Tsunamis

Parameter	Category	Frequency (f)	Percentage (%)
Disaster Knowledge	Low	25	29.1
	Moderate	53	61.6
	High	8	9.3
Emergency Response Plan	Low	60	69.8
	Moderate	21	24.4
	High	5	5.8
Disaster Warning System	Low	57	66.3
	Moderate	21	24.4
	High	8	9.3
Resource Mobilization	Low	75	87.2
	Moderate	4	4.7
	High	7	8.1

The study results indicate that out of 86 islamic boarding school students, more than half (60.5%) or 52 students exhibit a moderate level of preparedness for earthquakes and tsunamis. This finding aligns with research conducted by Rizki (2019) at junior high schools in Padang City, where 60.4% of 106 students demonstrated moderate preparedness levels. Similarly, Oktavia (2019) found that the majority

of junior high school students in red zones for earthquakes and tsunamis in coastal areas of Padang also had moderate preparedness levels. Comparable results were obtained by Devica et al. (2020), who reported that 68.3% of students in green zones and 61.8% in red zones at public junior high schools in Padang displayed moderate disaster preparedness levels.

Contrastingly, Rahmawati (2016) identified that 56.98% of students at SMPN 2 Imogiri, Bantul, had high preparedness levels, and Salsabila (2021) reported that 52.4% of SMPN 2 Painan students had high preparedness, attributed to their exposure to disaster-related knowledge and training.

In this study, islamic boarding school students predominantly exhibit moderate preparedness, with some students falling into the low category. This outcome is influenced by the lack of disaster-related information from government or non-government agencies, absence of visual aids like posters, and inadequate infrastructure such as evacuation routes or assembly points. Furthermore, non-academic activities like PMR, first aid, or scouting are not present, limiting students' skills in self-rescue or helping others during disasters.

The islamic boarding school has not conducted disaster-related seminars or simulations, as the institution has not permitted such activities. Consequently, all preparedness parameters disaster knowledge, emergency response planning, warning systems, and resource mobilization remain at moderate to low levels, with no single parameter categorized as high. Among these, disaster knowledge scored the highest (61.6% moderate), while resource mobilization was the lowest (87.2% low).

4. Conclusion

This study highlights the preparedness level of Islamic boarding school students in Pasie Nan Tigo, Padang, in facing earthquakes and tsunamis, which is generally at a moderate level. These findings contribute to the understanding of disaster preparedness in educational institutions, particularly in boarding schools, where students live in communal settings. To enhance resilience, disaster-related institutions should implement structured training programs and simulations tailored to the specific needs of these students. Future research should explore the effectiveness of various disaster education methods in improving preparedness and assess long-term behavioral changes resulting from such interventions.

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