

Post-traumatic stress disorder symptoms in adolescents affected by earthquakes: A descriptive study

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Abstract

Earthquakes are traumatic events that can cause long-term psychological impacts, especially in vulnerable groups such as adolescents. This study aims to assess the incidence of Post-Traumatic Stress Disorder (PTSD) symptoms among adolescents who have experienced earthquake disasters. This study employed a descriptive research design. A total of 235 students were selected using a stratified random sampling technique. Data collection was conducted using the PTSD Checklist for DSM-5 (PCL-5), which measures symptoms across four domains: re-experiencing, avoidance, negative alterations in cognition and mood, and hyperarousal. The research sample consisted of 234 adolescents selected using stratified random sampling. Inclusion criteria included adolescents living in earthquake-prone areas who had experienced an earthquake. Data analysis was performed using frequency distribution. Most adolescents, namely 83.4%, did not exhibit general PTSD symptoms. However, 3.8% and 1.3% respectively experienced mild and severe re-experiencing symptoms, 11.9% and 8.5% of adolescents experienced moderate and severe avoidance symptoms, 4.3% and 0.4% of adolescents experienced moderate and severe negative alterations in cognition and mood, and 16.6% and 3.8% of adolescents experienced hyperarousal symptoms. As a vulnerable group, to improve their mental health status, adolescents can be given psychological resilience training to deal with situations that affect their mental health through early detection, symptom and risk management, and mental capacity building through supportive activities both in schools and in the community.

Keywords

Adolescent mental health, Earthquakes, Post-traumatic stress disorder, Resilience

Introduction

Indonesia lies between two continents: Asia and Australia, and two oceans: the Indian Ocean and the Pacific Ocean. This geographical location places it at the intersection of tectonic plates: the Circum-Mediterranean Plate, which forms trenches and mountain ranges on the islands of Sumatra, Java, Bali, and Nusa Tenggara, and the Circum-Pacific Plate, which creates trenches and mountain ranges in North Sulawesi, northern Papua,

Published:

May 04, 2026

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Selection and Peer-review under the responsibility of the 7th BIS-HSS 2025 Committee

and along the Banda Sea [1]. Similarly, the earthquake in Palu, which also struck Central Sulawesi on September 28, 2018, with a magnitude of 7.4, was not the first such event in the region. Historical records of disasters in Indonesia show that Central Sulawesi has experienced seven previous major earthquakes: in 1927, 1938, 1996, 1998, 2005, 2008, and 2012 [1].

According to the Banjarnegara Station of the Meteorology, Climatology, and Geophysics Agency [2], there are 13 active faults in Central Java that could potentially trigger earthquakes, one of which is located on the border between Batang Regency and Pekalongan City. These thirteen active faults include the Brebes, Tegal, Pemalang, Pekalongan, Batang, Weleri, Semarang, Ungaran, Muria, Pati, Lasem, and Grobogan faults. Heri Susanto, Head of the Banjarnegara BMKG Station, stated that the earthquake in Batang is suspected to be related to the Pekalongan fault. Heri Susanto explained that this fault is part of the Belibis Gendeng fault, as Central Java has 13 active faults stretching from west to east in the Batang region [3].

Earthquakes can impact various aspects of life, including physical, economic, and psychological aspects, for individuals, families, and communities. In addition to the direct physical impact on victims, earthquakes can also cause broader effects, such as disruption to economic activity, damage to infrastructure, including health facilities and housing, difficulties in accessing clean water, and poor sanitation, all of which can worsen the situation for disaster victims. The psychological impact of earthquakes can be long-lasting, including causing anxiety, depression, and post-traumatic stress disorder (PTSD) in individuals, families, and communities, both directly and indirectly affected [4].

Post-traumatic stress disorder is a type of mental disorder often experienced by disaster victims. PTSD is a psychological condition in which a person experiences anxiety attacks triggered by trauma from a previous experience. The frightening experience of a natural disaster can be a factor that disturbs the minds of victims. Therefore, post-earthquake trauma recovery is essential. For adolescents, trauma recovery is usually achieved through counseling. This process tends to be more effective in adolescents because they can easily express their feelings verbally. It is hoped that through counseling, the trauma experienced by victims can be reduced [5].

Based on the results of a preliminary study on adolescents in the Batang region, the earthquake caused profound psychological impacts, such as fear, anxiety, and post-traumatic stress disorder (PTSD). Adolescents experienced sleep disturbances, nightmares, and persistent feelings of anxiety after the event. The fear of possible aftershocks still haunts them. Considering the background described above, researchers decided to investigate this phenomenon further in a study entitled "Description of Post-Traumatic Stress Disorder (PTSD) in Adolescents in Earthquake-Prone Areas."

Method

This study employed a descriptive research design. The research sample consisted of 235 adolescents selected using stratified random sampling. Inclusion criteria included adolescents living in earthquake-prone areas who had experienced an earthquake. The sample was obtained from 83 adolescents in first grade of junior high school, 75 adolescents in second grade, and 77 adolescents in third grade. Data collection was conducted using the PTSD Checklist for DSM-5 (PCL-5), which measures symptoms across four domains: re-experiencing, avoidance, negative alternations in cognition and mood, and hyperarousal. The PCL-5 questionnaire consists of 20 questions. A score of 20 on questions 1-5 includes re-experiencing symptoms, a score of 8 on questions 6-7 includes avoidance symptoms, a score of 28 on questions 8-14 includes negative alternations in cognition and mood symptoms, and a score of 24 on questions 15-20 includes hyperarousal symptoms. There are 5 scores for each question: 0 for never, 1 for rarely, 2 for sometimes, 3 for often, and 4 for very often. Data analysis was performed using frequency distribution. This research has passed the ethics test and the research ethics committee of the institution and community service of the Universitas Muhammadiyah Pekajangan Pekalongan with number 030/KEPUMPP/1/2025.

Results and Discussion

Results

The average age was 13.69 years, with a standard deviation of 0.784. This means there is variation around the mean, with most of the data falling within a narrow range. The youngest age in this data set was 13, while the oldest was 16. A total of 124 students (52.8%) were male, while 111 students (47.2%) were female.

The analysis of post-traumatic stress disorder symptoms, as shown in [Table 1](#), most respondents fell within the normal category across the four symptom domains. Regarding reexperiencing symptoms, 193 respondents (82.1%) fell within the normal category, 30 respondents (12.8%) fell within the mild category, 9 respondents (3.8%) fell within the moderate category, and 3 respondents (1.3%) fell within the severe category. In avoidance symptoms, 148 respondents (63.0%) experienced the normal category, 39 respondents (16.6%) experienced the mild category, while 28 respondents (11.9%) experienced the moderate category, and 20 respondents (8.5%) were in the severe category. In negative symptoms of alternations in cognition and mood, 214 respondents (91.1%) showed the normal symptom category, 10 respondents (4.3%) showed the mild and moderate symptom categories, and 1 respondent (0.4%) was in the severe category. As for hyper-arousal symptoms, 139 respondents (59.1%) were in the normal symptom category, 48 respondents (20.4%) were in the mild symptom category, 39 respondents (16.6%) were in the moderate symptom category, and 9 respondents (3.8%) were in the severe symptom category.

Table 1. Symptoms of post-traumatic stress disorder in adolescents in earthquake-prone areas

Post Traumatic Stress Disorder	Re-Experiencing	%	Avoidance	%	Negative Alternations	%	Hyperarousal	%
Normal	193	82.1	148	63.0	214	91.1	139	59.1
Mild	30	12.8	39	16.6	10	4.3	48	20.4
Moderate	9	3.8	28	11.9	10	4.3	39	16.6
Severe	3	1.3	20	8.5	1	0.4	9	3.8
Total	235	100	235	100	235	100	235	100

Discussion

Adolescents generally have quite good adaptive abilities in dealing with stress. Although some experience flashbacks or nightmares (reexperiencing), many are able to control their negative emotions and thoughts so that these symptoms do not develop into serious disorders. One study revealed that although 98.3% of respondents exhibited reexperiencing symptoms, the majority were still classified as normal or mild. This finding indicates the existence of fairly strong psychological adaptation mechanisms and resilience among adolescents affected by disasters [6].

An example of a question indicator for reexperiencing symptoms frequently experienced by respondents is “repeatedly reliving the disaster event and being unable to control it,” illustrating the presence of unwanted and difficult-to-control thought intrusions. The emergence of post-disaster intrusive memories is generally triggered by intense peritraumatic responses, such as deep fear, feelings of helplessness, and dissociation during the traumatic event. These responses can interfere with information processing during the event, possibly increasing the occurrence of involuntary intrusive memories [7].

Then, the indicator of questions that often appear in the symptoms of negative alternations in cognition and mood is “having limited feelings such as difficulty experiencing happiness, satisfaction, or affection?” These limited feelings are a form of post-traumatic psychological response known as emotional numbing. In adolescents affected by disasters, this condition appears as a form of self-protection mechanism against emotions that are too heavy to be faced consciously. And when someone faces a traumatic event, such as the loss of a family member, a home, or a sense of security, their psychological mechanism reflexively tries to “turn off” the emotional response to avoid deeper suffering [8]. There is also an average of respondents with a severe category are symptoms of avoidance (8.5%) and symptoms of hyper-arousal (3.8%). This finding is in line with research that revealed that as many as 84.2% experienced symptoms of hyper-arousal, which is the lowest percentage compared to symptoms of negative alternations in mood and cognition, re-experiencing, and avoidance. This likely occurs because the traumatic event has passed long enough for individuals to return to normal activities [9].

As indicated in the avoidance symptom indicator, “avoiding memories, thoughts, or feelings related to the earthquake?” the most common symptom experienced by

respondents was difficulty expressing their feelings. This condition is likely triggered by negative appraisals of past traumatic experiences, which give rise to feelings of fear, helplessness, and shame. These feelings can impact an individual's ability to build social relationships with those around them, making it difficult for them to express their emotions openly [10].

According to the theory proposed by Foa (2000), individuals with PTSD have difficulty cognitively processing trauma due to the intense and repetitive activation of fear structures. This drives them to avoid negative thoughts and emotions related to the traumatic experience. Therefore, PTSD sufferers tend to avoid various stimuli that might exacerbate their recollection of the traumatic event. When emotions become too intense, individuals often try to suppress thoughts about the past. This process then develops into a conflict between the desire to assimilate the experience and the urge to avoid it [11].

An example of a frequently asked question related to hyperarousal symptoms is “do you experience sleep disturbances (difficulty falling asleep or staying awake)?” After experiencing a disaster, adolescents tend to experience excessive sympathetic nervous system activity, which keeps them in a state of constant alertness, making it difficult to achieve restful sleep. Adolescents affected by disasters often experience sleep disturbances due to flashbacks to the traumatic event, which significantly reduces their sleep quality [12].

Conclusion

This study found that Post-Traumatic Stress Disorder (PTSD) among adolescents showed that 83.4% of respondents were in the category of not experiencing PTSD. 11.1% were in the mild category, 5.1% in the moderate category, and only 0.4% experienced severe PTSD. These findings indicate that despite exposure to disasters, the majority of adolescents have fairly good adaptive capacity and psychological resilience.

References

1. S. Yulianto, R. Apriyadi, A. Aprilyanto, T. Winugroho, I. Ponangsera, and W. Wilopo, “Histori Bencana dan Penanggulangannya di Indonesia Ditinjau Dari Perspektif Keamanan Nasional,” *PENDIPA J. Sci. Educ.*, vol. 5, pp. 180–187, Jan. 2021, doi: 10.33369/pendipa.5.2.180-187.
2. BMKG, “Gempa Bumi. Badan Meteorologi Klimatologi Dan Geofisika,” BMKG, 2024. [Online]. Available: http://inatews2.bmkg.go.id/new/tentang_eq.php
3. Anantara, “BMKG Sebut 13 Sesar Aktif di Jawa Tengah Berpotensi Gempa Bumi,” *Bisnis Tempo*, 2024. [Online]. Available: <https://bisnis.tempo.co/read/1889023/bmkg-sebut-13-sesar-aktif-di-jawa-tengah-berpotensi-gempa-warga-batang-dan-pekalonganperlu-rumah-anti-lindu>
4. M. Mutianingsih and M. Mustikasari, “Dampak Psikologis Gempa Bumi terhadap Kelompok Rentan : Lansia,” *J. Ilm. Kesehat. Keperawatan*, vol. 15, p. 18, Jul. 2019, doi: 10.26753/jikk.v15i1.290.
5. M. Miswanti, M. Maidawilis, J. Gusni, R. Ani, and H. Hasmita, “Penanganan Kesehatan Jiwa pada Korban Bencana,” *J. Pengabd. Masy. Indones.*, vol. 2, pp. 212–222, Jun. 2023, doi: 10.55606/jpmi.v2i2.2403.
6. A. S. Mahfuzhah et al., “1 *, 2 , 3 1,” vol. 6, no. 1, 2021.
7. A. Massazza, H. Joffe, and C. R. Brewin, “Intrusive memories following disaster: Relationship with peritraumatic responses and later affect,” *J. Abnorm. Psychol.*, vol. 130, no. 7, pp. 727–735, 2021,

[Online]. Available: <https://doi.org/10.1037/abn0000694>

8. N. Wang, M. C. Chung, and Y. Wang, "The relationship between posttraumatic stress disorder, trauma centrality, posttraumatic growth and psychiatric co-morbidity among Chinese adolescents.," *Asian J. Psychiatr.*, vol. 49, p. 101940, Mar. 2020, doi: 10.1016/j.ajp.2020.101940.
9. T. Seniwati, K. Erika, and H. Hapsah, "Childhood post-traumatic stress disorder: A post-flood overview," *J. Holist. Nurs. Sci.*, vol. 9, Jun. 2022, doi: 10.31603/nursing.v9i1.6597.
10. I. Iskandar and S. Rahayu, "Dampak Psikologis dan Upaya Penanggulangan Bencana Gempa Bumi," *Galen. J. Kedokt. dan Kesehat. Mhs. Malikussaleh*, vol. 1, p. 105, Oct. 2022, doi: 10.29103/jkkmm.v1i3.17469.
11. F. Erlin and I. Sari, "Gejala PTSD (Post Traumatic Stress Disorder) Akibat Bencana Banjir Pada Masyarakat Kelurahan Meranti Rumbai Pesisir Pekanbaru," *Din. Lingkung. Indones.*, vol. 7, p. 17, Jan. 2020, doi: 10.31258/dli.7.1.p.17-21.
12. G. Tidur, D. A. N. Gejala, U. N. Rohmah, S. G. Harahap, and Y. Yari, "Description of Post Traumatic Stress Disorder , Sleep Disorders , Anxiety , and Symptoms of Depression in Earthquake Victims in Cianjur," vol. 2, no. April, pp. 36–45, 2023.