



THE PSYCHOLOGICAL IMPACT OF EARTHQUAKES ON CHILDREN: A CROSS-SECTIONAL STUDY IN HERAT, AFGHANISTAN

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Abstract

Background: Earthquakes, as devastating natural disasters, can have profound and long-term psychological consequences, particularly for children. The frequency of aftershocks following earthquakes has been shown to exacerbate these negative effects. This study aimed to investigate the prevalence of depression and anxiety levels among children exposed to the October 2023 earthquakes in Herat, Afghanistan.

Methods: A community-based cross-sectional study was conducted in October and November 2023, involving 420 participants (227 boys and 193 girls). Sociodemographic data were collected using a 14-item questionnaire; the Patient Health Questionnaire-9 (PHQ-9) modified for adolescents and the Screen for Child Anxiety Related Emotional Disorders (SCARED) had been utilized to assess depression and anxiety levels, respectively. Data analysis was carried out using IBM SPSS Statistics version 27.

Results: A high prevalence of depression among children (82.6%) was found among study participants. Additionally, the study identified significant rates of anxiety disorders, including panic disorder (67%), generalized anxiety disorder (27.1%), separation anxiety disorder (94.4%), social phobia (9.5%), and school avoidance (15%). Based on the sociodemographic data, gender and the presence of disturbing night dreams were significantly associated with both anxiety and depression. The loss of a first-degree family member due to the earthquake emerged as the sole factor significantly associated with depression.

Conclusion: The present study demonstrates a markedly high prevalence of depressive and anxiety symptoms among children following the October 2023 earthquakes in Herat, with separation anxiety and panic disorder emerging as the most common conditions. These findings highlight the urgent imperative to develop and implement specialized mental health interventions tailored to the needs of disaster-affected pediatric populations. Establishing culturally appropriate early intervention strategies and community-based psychosocial support programs are essential to ease long-term psychological consequences and promote resilience among affected children. Furthermore, these findings call for the integration of mental health services into disaster response frameworks across earthquake-prone regions.

Keywords: Afghanistan, anxiety, depression, earthquake, Herat.

Introduction

An earthquake is defined as the sudden release of accumulated energy within the Earth's crust, typically occurring along a fault line that delineates the boundaries between tectonic plates [1, 2]. Afghanistan is one of the earthquake-prone countries in the world, yet reporting on its past earthquakes is challenging due to a lack of precise records [1, 3]. The frequency of mental health conditions such as substance misuse, depression, anxiety, post-traumatic stress disorder (PTSD), and difficulty sleeping increases after an earthquake [4]. Four strong earthquakes with a magnitude of 6.3 occurred in

Herat Province between October 7 and October 15, 2023 [5]. The earthquakes subjected approximately 1.6 million individuals to intense seismic activity and resulted in at least 114,000 people requiring urgent humanitarian assistance [6]. Based on preliminary assessments, the first two earthquakes that occurred on October 7 and 11 resulted in 1,480 fatalities and 1,950 injuries.

The satellite imagery that is currently available shows that 289 communities were affected very heavily (n=11), highly (n=110) or moderately (n=168); moreover, the October 15 earthquake is thought to have damaged 30 new settlements spread over two districts [6].

Nine of the twenty-one Eastern Mediterranean countries—Iran, Pakistan, Afghanistan, Sudan, Somalia, Algeria, Morocco, Yemen, and Egypt—had higher rates of natural disasters than any other country [7].

The second most common type of disaster in the Eastern Mediterranean is earthquakes [7].

Being present at a natural disaster has a profound impact on people, often leading to feelings of anxiety and stress [8, 9]. When the initial level of anxiety and stress does not go down over time, these reactions—which at first seem to be a normal response—can develop into a significant mental health issue [8].

Geographically, there is a wide range in the prevalence of post-earthquake mental disorders; for example, a systematic review and meta-analysis in Asia, Europe, and America shows 84.0% anxiety and 52.7% depression; [10] 52.0% anxiety, and 52.0% depression in Piura, Peru [11]

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14.5% anxiety, and 16.1% depression in Sichuan, China[12] and 74% moderate anxiety, and 41.5% severe depression in Kermanshah, Iran[13] This study aims to investigate the association between depression and anxiety levels in adolescents and children and the incidence of earthquakes, while considering relevant contextual factors.

Materials and methods

Design and setting

A community-based cross-sectional study was conducted in October and November 2023 to investigate the depression and anxiety levels among earthquake survivors residing in the disaster-affected villages of Zinda Jan, Herat province, Afghanistan.

Eligibility criteria

Eligibility criteria included earthquake survivors aged between 11 and 17 years who were residents of Zinda Jan District, Herat province.

Target population

Data from the National Statistics and Information Authority (2023) indicates that Zinda Jan had a population of 68,001 individuals, of whom 53.7 % were aged under 18 years.

Study participants

To determine the sample size, we used the Raosoft sample size calculator (<http://www.raosoft.com/samplesize.html>) with a 5% margin of error, a 95% confidence level, and a 50% response distribution. This resulted in a minimum recommended sample size of 377. To account for potential incomplete or incorrect responses, we increased the sample size by >10% (n=43), bringing the final sample to 420. A convenient sampling strategy was then employed for participant selection.

Data collection

Sociodemographic data were collected using a 14-item structured questionnaire. Data on depression were collected using the Patient Health Questionnaire-9 (PHQ-9) [14] for children. Data for anxiety, the Screen for Child Anxiety Related Emotional Disorders (SCARED)(15) was

employed to identify symptoms of general anxiety and specific conditions like panic disorder, generalized anxiety disorder, separation anxiety disorder, social anxiety disorder, and school avoidance. Scoring and categorization of data were performed according to the guidelines of the instruments.

Data analysis

Data analysis was conducted using IBM SPSS Statistics (version 27). Data with non-normal distributions were summarized using median and interquartile range (IQR). Categorical data were presented with frequencies and percentages. The chi-square test was used to assess associations between two sets of categorical variables. The significance value was set to 0.05 in all analyses.

Ethical consideration

Written informed consent was obtained from the parents of each participant. The study protocol was approved by the Human Ethics Committee of Herat University (approval number #231018).

Results

Participant's characteristics

A total of 420 children participated in the study, including 227 (54%) boys and 193 (46%) girls from 12 earthquake-affected villages in Zinda Jan district of Herat Province. Table 1 presents the sociodemographic factors of participants included in this study.

Discussion

This study aimed to evaluate the prevalence of anxiety and depression levels among earthquake survivors in Zinda Jan District of Herat province, as well as to ascertain the sociodemographic and earthquake-related associated factors of these mental diseases.

In this study, the overall prevalence of depression was 82.6%, which is greater than the rate of depression found in comparable studies conducted in Turkey [16].

This is not surprising given that the study was carried out among earthquake survivors in the villages of the Zinda Jan district, where the region experiences frequent earthquakes and the majority of significant damage and fatalities have been documented as a result of the earthquakes [17].

Table 1: Number and percentage of participants according to sociodemographic factors

Variable	
Gender	
Boys	
Girls	
level of Education	
No Grade	
Grade 6	
Grade 7	
Grade 8	
Head of the family	
Mother	
Father	
Other	
Father's job	
Died	
Employed	
Unemployed	
Mother's job	
Died	
Housewife	
Did the parents remarried?	
yes	
No	
Economic situation	
Poor	

Table 1. Continued.....

Father literacy	
Illiterate	-
Literate	
Mother literacy	
Illiterate	-
Literate	
Does the child helps the family members at home	
yes	
no	-
How many Hur the child work in 24 hr	
Doesn't work	
1 to 3 hrs	
4 to 6 hrs	-
7 hrs and above	
How many Hr the child sleep	
1 to 3 hrs	
4 to 6 hrs	-
7 to 9 hrs	
10 hrs and above	-
Does the child have disturbing dreams at ight	
Yes	
No	-
Does the child get more depended on Parents than before	
Yes	
No	
In general, is the child worried about the lack of food for his far	
Yes	
No	
Is the child worried about the earthquake happening again	

Medium	132	31.4
Good	4	1
<hr/>		
Has the child lost the first level of family members in earthquake		
Yes	173	41.2
No	247	58.8
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Has the first grad of family members injured		
Yes	224	53.3
No	196	46.7
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Did the child injured		
Yes	81	19.3
No	339	80.7
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Has the child brother and sister		
Yes	414	98.6
No	6	1.4
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Which number you are in the family		
1 to 3	244	58.1
4 to 6	142	33.8
7 and above	34	8.1
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Table 3. The prevalence of anxiety among study participants.

Anxiety categories	Normal N (%)	Yes N (%)
Anxiety Disorder	107 (25.5)	313 (74.5)
Panic Disorder	171 (40.7)	249 (59.3)
Generalized Anxiety Disorder	245 (58.3)	175 (41.7)
Separation Anxiety Disorder	18 (4.3)	402 (95.7)
Social Anxiety Disorder.	342 (81.4)	78 (18.6)
School Avoidance	299 (71.2)	121 (28.8)

Table 4. The significance level of the association between sociodemographic characteristics and mental disorders among study participants

Sociodemographic factors	Depression	GAD
Gender	0.024	0.004
level of Education	0.056	0.292
Father's job	0.306	0.345
Mother's job	NA	NA
Economic situation	0.127	0.544
Has the child lost the first level of family members in earthquake?	0.007	0.535
Has the first grad of family members injured?	0.168	0.741
Did the child injured?	0.872	0.188
Father literacy	0.628	0.066
Mother literacy	0.288	0.720
Does the child have disturbing dreams at night?	0.010	0.011
In general, is the child worried about the lack of food for his family?	0.362	0.275
Is the child worried about the earthquake happening again?	0.114	0.741

Additionally, we found that 74.5% of research participants had anxiety. In comparison with similar studies conducted in China, this indicates a significantly higher prevalence of anxiety [12].

We also found that the following factors were statistically significantly linked to depression: dreaming nightmare, gender, and the loss of first-grade family members. Gender [18-20] grief-related characteristics [21, 22], nightmare [23, 24-26], and sadness were also found to be significantly correlated with depression in similar research.

Additionally, this study identified that among study participants, anxiety was correlated with gender and nightmares. Research conducted in Sichuan, China [18] and Nepal [27] revealed that girls had a significantly higher prevalence of anxiety than boys, and that they were more likely to exhibit symptoms of chronic anxiety after the earthquake. Similar studies also demonstrate a significant relationship between gender and anxiety. Furthermore, following the earthquake, girls in Haiti, [28] Chili, [29] and China, [30] experienced noticeably greater levels of anxiety than boys. Additionally, studies show a strong correlation between anxiety and nightmares, [23, 31]. According to a study conducted in Germany on older persons, people with anxiety had noticeably more nightmares than people without the disorder [32].

Limitations

Data on child mental health in Afghanistan remains scarce, largely due to the limited availability of trained child psychiatrists and psychologists across the country. This shortage significantly hampers the accurate identification and documentation of mental health disorders among children, particularly in rural and underserved districts.

The current study utilized structured interview questionnaires as its primary data collection tool; however, it is important to recognize the inherent limitations of such instruments in establishing definitive clinical diagnoses. A more comprehensive assessment of children's mental health would require in-depth clinical evaluations conducted by qualified professionals. Furthermore, given the age of the participants, parental or legal guardian involvement was essential during the interview process, as self-administered questionnaires were not appropriate for this population.

Recommendation

To enhance the quality and scope of data on child mental health within this district and adjacent regions, it is recommended that mobile mental health clinics be established and operated by qualified professionals, including psychiatrists and clinical psychologists. These mobile units

would be instrumental in delivering essential diagnostic and therapeutic services, facilitating comprehensive evaluations, and addressing psychological disorders among children in underserved areas.

In the context of humanitarian emergencies, it is imperative to integrate mental health support as a core component of the initial response. Early intervention strategies should include targeted education for community stakeholders—such as parents, educators, local leaders, and children—regarding the psychological impact of crises. Public awareness initiatives, routine mental health screenings, and culturally sensitive community engagement activities can significantly contribute to the promotion of psychological resilience and the timely identification of mental health concerns.

Conclusion

This study provides compelling evidence of the substantial psychological impact that the October 2023 earthquakes in Herat have had on children, with notably high rates of depression and various anxiety disorders. The predominance of separation anxiety, panic symptoms, and generalized anxiety reflects the acute vulnerability of children in post-disaster settings. These findings emphasize the urgent necessity for targeted mental health responses, including child-centered psychosocial care, community-based support systems, and integration of mental health services into disaster relief operations. Strengthening mental health infrastructure and fostering awareness among caregivers and educators will be critical to safeguarding the emotional well-being of children in regions prone to seismic activity.

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References

- Gates AE RD. Encyclopedia of earthquakes and volcanoes. Third ed. New York: Facts On File Inc;; 2007. 365 p.
- Caputo R, Pavlides SB. Earthquake geology: Methods and applications. Tectonophysics. 2008;453(1):1-6.
- Waseem M, Lateef A, Ahmad I, Khan S, Ahmed W. Seismic hazard assessment of Afghanistan. Journal of Seismology. 2019;23(2):217-42.
- Hussaini SJ, Ali SH, Rahmat ZS, Islam Z, Tharwani ZH. Mental health impacts of earthquake on Afghans amidst humanitarian crisis. Annals of Medicine and Surgery. 2022;81.
- reliefweb. Afghanistan Earthquakes in Herat Province, Health Situation Report NO. 9, 17-19: reliefweb; 2024 [Available from: <https://reliefweb.int/report/afghanistan/afghanistan-earthquakes-herat-province-health-situation-report-no-9-17-19-october-2023>].
- UNOCHA. Afghanistan: Herat Earthquake Response Plan: UNOCHA; 2023 [Available from: <https://www.unocha.org/publications/report/afghanistan/afghanistan-herat-earthquake-response-plan-october-2023-march-2024>].
- Hosseinejad M, Yazdi-Feyzabadi V, Hajebi A, Bahramnejad A, Baneshi R, Ershad Sarabi R, et al. Prevalence of Posttraumatic Stress Disorder Following the Earthquake in Iran and Pakistan: A Systematic Review and Meta-Analysis. Disaster Medicine and Public Health Preparedness. 2022;16(2):801-8.
- Gerstner RMF, Lara-Lara F, Vasconez E, Viscor G, Jarrin JD, Ortiz-Prado E. Earthquake-related stressors associated with suicidality, depression, anxiety and post-traumatic stress in adolescents from Muisne after the earthquake 2016 in Ecuador. BMC Psychiatry. 2020;20(1):347.
- Kar N, Bastia BK. Post-traumatic stress disorder, depression and generalised anxiety disorder in adolescents after a natural disaster: a study of comorbidity. Clin Pract Epidemiol Ment Health. 2006;2:17.
- Keya TA, Leela A, Habib N, Rashid M, Bakthavatchalam P. Mental Health Disorders Due to Disaster Exposure: A Systematic Review and Meta-Analysis. Cureus. 2023;15(4):e37031.
- Valladares-Garrido MJ, Zapata-Castro LE, Domínguez-Troncos H, García-Vicente A, León-Figueroa DA, Zila-Velasque JP, et al. Mental Health Disturbance after a Major Earthquake in Northern Peru: A Preliminary, Cross-Sectional Study. Int J Environ Res Public Health. 2022;19(14).
- Liu M, Wang L, Shi Z, Zhang Z, Zhang K, Shen J. Mental health problems among children one-year after Sichuan earthquake in China: a follow-up study. PLoS One. 2011;6(2):e14706.
- Bavafa A, Khazaie H, Khaledi-Paveh B, Rezaie L. The relationship of severity of symptoms of depression, anxiety, and stress with sleep quality in earthquake survivors in Kermanshah. J Inj Violence Res. 2019;11(2):225-32.
- Kroenke K, Spitzer RL, Williams JBW. The PHQ-9. Journal of General Internal Medicine. 2001;16(9):606-13.
- Birmaher B, Khetarpal S, Brent D, Cully M, Balach L, Kaufman J, et al. The Screen for Child Anxiety Related Emotional Disorders (SCARED): Scale Construction and Psychometric Characteristics. Journal of the American Academy of Child & Adolescent Psychiatry. 1997;36(4):545-53.
- Ekşi A, L. BK, Hayriye E-V, Gulcan P, Reyhan S, Derya T, et al. Risk factors for the development of PTSD and depression among child and adolescent victims following a 7.4 magnitude earthquake. International Journal of Psychiatry in Clinical Practice. 2007;11(3):190-9.
- Afghanistan UN. UN Reports Staggering US\$ 402.9 Million in Recovery Needs Following Last Year's Earthquakes in Herat, Afghanistan United Nations Afghanistan 2024 [Available from: <https://www.undp.org/afghanistan/press-releases/un-reports-staggering-us-4029-million-recovery-needs-following-last-years-earthquakes-herat-afghanistan>].
- Fu M, Hall BJ, Xi J, Guo J. Gender differences in trajectories of mental health symptoms among Chinese earthquake survivors. Journal of Psychiatric Research. 2021;142:117-24.
- Liu Y, Liu Y, Wang Y, Li Z, Luo Y. Earthquake exposure during adolescence and later-life depressive symptoms: A national cross-sectional survey. SSM - Population Health. 2023;23:101490.
- Ataya J, Soqia J, Ataya J, AlMhasneh R, Batesh D, Alkhadraa D, et al. Sleep quality and mental health differences following Syria-Turkey earthquakes: A

- cross-sectional study. *International Journal of Social Psychiatry*. 2024;70(4):700-8.
21. Zara A. Loss, grief and depression: potential risk factors in grief-related depression. *Anatolian Journal of Psychiatry/Anadolu Psikiyatri Dergisi*. 2019;20(2).
 22. Livings M, Smith-Greenaway E, Margolis R, Verdery AM. Bereavement & mental health: The generational consequences of a grandparent's death. *SSM - Mental Health*. 2022;2:100100.
 23. Sheaves B, Rek S, Freeman D. Nightmares and psychiatric symptoms: A systematic review of longitudinal, experimental, and clinical trial studies. *Clin Psychol Rev*. 2023;100:102241.
 24. Hedström AK, Bellocco R, Hössjer O, Ye W, Trolle Lagerros Y, Åkerstedt T. The relationship between nightmares, depression and suicide. *Sleep Medicine*. 2021;77:1-6.
 25. Ollila HM, Sinnott-Armstrong N, Kantojärvi K, Broberg M, Palviainen T, Jones S, et al. Nightmares share genetic risk factors with sleep and psychiatric traits. *Translational Psychiatry*. 2024;14(1):123.
 26. Faccini J, Del-Monte J. Bad dream, nightmares and psychopathology: a systematic review. *Frontiers in Psychiatry*. 2024;15.
 27. Adhikari SB, Bhatta DN, Rayamajhi D, Adhikari R. The 2015 Nepal earthquakes and psychosocial impact among Nepali speaking population in the United States of America. *Progress in Disaster Science*. 2021;9:100144.
 28. Dube A, Moffatt M, Davison C, Bartels S. Health Outcomes for Children in Haiti Since the 2010 Earthquake: A Systematic Review. *Prehospital and Disaster Medicine*. 2018;33(1):77-88.
 29. McLean CP, Asnaani A, Litz BT, Hofmann SG. Gender differences in anxiety disorders: prevalence, course of illness, comorbidity and burden of illness. *J Psychiatr Res*. 2011;45(8):1027-35.
 30. Xu J, Xie L, Li B, Li N, Yang Y. Anxiety symptoms among children after the Wenchuan earthquake in China. *Nord J Psychiatry*. 2012;66(5):349-54.
 31. Nadorff MR, Porter B, Rhoades HM, Greisinger AJ, Kunik ME, Stanley MA. Bad dream frequency in older adults with generalized anxiety disorder: prevalence, correlates, and effect of cognitive behavioral treatment for anxiety. *Behav Sleep Med*. 2014;12(1):28-40.
 32. Coolidge FL, Segal DL, Coolidge CM, Spinath FM, Gottschling J. Do Nightmares and Generalized Anxiety Disorder in Childhood and Adolescence have a Common Genetic Origin? *Behavior Genetics*. 2010;40(3):349-56.