

Interplay of Post-Traumatic Stress Disorder, General Anxiety Disorder and Resilience among Earthquake Survivors in Zinda Jan District of Herat Province

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ABSTRACT

Background: Frequent earthquakes that hit Herat province in October 2023 resulted in considerable loss of lives and massive property damage. They caused massive physical and psychosocial injuries; while physical injuries could be treated by healthcare professionals, psychological injuries could be neglected. This study aimed to assess the prevalence and associated factors of post-traumatic stress disorder (PTSD) and general anxiety disorder (GAD); and their association with resilience among earthquake survivors in Zinda Jan district.

Materials and Methods: This community-based cross-sectional study was conducted during October and November 2023, among 418 cases -including 206 (49.3%) males and 212 (50.7%) females- with a mean age of 40.16±14.17 years. Sociodemographic data was collected via a structured questionnaire, data on PTSD was collected using the PTSD Checklist for DSM-5 (PCL-5), and data on GAD was collected via the Dari-version of GAD-7 questionnaire.

Findings: GAD was detected in all (100%) participants, of whom 6 (1.4%), 29 (6.9%), and 383 (91.6%) had mild, moderate, and severe anxiety, respectively. Furthermore, 153 (36.6%), 134 (32.1%) and 131 (31.3%) participants suffered from mild, moderate and severe PTSD. As per resilience, 153 (36.6%) had low resilience, 142 (34.0%) had moderate resilience, and 123 (29.4%) had high resilience. There was a significant association between resilience and PTSD ($p=0.011$), but no significant association was observed between resilience and GAD ($p=0.515$). GAD was significantly associated with gender, marital status, and participants' access to mental health. A significant association was found between PTSD and participants' occupation, nutrition status, and access to mental health.

Conclusion: The interplay between post-traumatic stress disorder, generalized anxiety disorder and resilience among earthquake survivors in the Zinda Jan district is a complex and multifaceted issue that demands further research and intervention. While the experiences of an earthquake can lead to the development of PTSD and GAD, resilience plays a crucial role in helping individuals overcome these challenges and rebuild their lives. A comprehensive understanding of this interplay can inform the development of effective interventions and prevention programs to support earthquake survivors and promote their overall well-being.

Keywords: Earthquake, GAD, PTSD, Herat, Resilience

INTRODUCTION

On 7 October 2023, an earthquake measuring 6.3 Richter hit Herat province in the west of Afghanistan, with the epicenter in Zinda Jan District, 38 km west of the city. Three more shocks with the same magnitude hit the area on the same day, 11th October and 15th October 2023. These four devastating earthquakes resulted in the destruction of 12 villages and a partial demolition of dozens more in Zinda Jan, destroying 1,983 residential houses, according to The Ministry of Disaster Management of Afghanistan (The Khaama Press News Agency, 2023). The four large earthquakes and dozens more aftershocks resulted in 2,053 fatalities and around 1,240 serious injuries, over 90% of whom were women and children (The Times of India, 2023). The earthquakes disrupted the normal lives of Herat residents, with over 80% of shops closed and businesses on hold. Almost all people slept outdoors, either in the parks, gardens, or streets at night. It also affected the economic, social, ecological, educational, physical, and psychological aspects of Herat residents. While physical injuries could be treated by healthcare staff, psychological injuries could be neglected.

The experience of psychological and mental disorders is common after high-scale earthquakes, resulting in short-term and long-term mental sequelae, many of which last for years. Post-traumatic stress disorder (PTSD) is a mental health condition that can develop after someone experiences or witnesses a life-threatening event, such as a natural disaster (Acharya Pandey et al., 2023). On the other hand, Generalized Anxiety Disorder (GAD) is a mental health condition characterized by excessive worry and anxiety about everyday situations (Gerstner et al., 2020). The prevalence of PTSD after an earthquake has shown a great geographical variation with 4.1% in Kumamoto, Japan (Ide-Okochi et al., 2022); 9.7% in Wenchuan, China (Yang et al., 2021); 11.4% Tohoku, Japan (Hikichi et al., 2016); 18.9% in Barpak, Nepal (Acharya Pandey et al., 2023); 19.2% in Kathmandu, Nepal (Sharma et al., 2021); 20.3% in Piura, Peru (Valladares-Garrido et al., 2022); 24.0% in Bhaktapur, Nepal (Kvestad et al., 2019); 33.2% in Muisne, Ecuador (Gerstner et al., 2020); 58.3% in Sumatra Island, Indonesia (Marthoenis et al., 2019); and 69.9% in Lombok, Indonesia (Wahab et al., 2021). Similarly, the prevalence of anxiety was reported as 15.2% in Muisne, Ecuador (Gerstner et al., 2020) and 32.1% in Sumatra Island, Indonesia (Marthoenis et al., 2019).

Research has shown that of all mental disorders, PTSD is the most common (Farooqui et al., 2017). Evidence reveals that children with PTSD are more likely to exhibit behavioral problems when they start school (Liberty et al., 2016), school adaptation (Liu et al., 2019), mortality in older survivors (Li et al., 2019), and the mental health of survivors' offspring (Honda et al., 2019). The dread effects of PTSD and mental disorders on individuals and a community can be prevented by community social cohesion (Hikichi et al., 2016) and cognitive-behavior therapy (Leiva-Bianchi et al., 2018).

Accumulating evidence suggests that being female (Acharya Pandey et al., 2023; Ide-Okochi et al., 2022; Marthoenis et al., 2019), older age (Liberty et al., 2016; Marthoenis et al., 2019), deaths of family members (Kvestad et al., 2019), loss of property especially residence (Hikichi et al., 2016), physical injuries (Liang et al., 2019; Marthoenis et al., 2019), low educational levels (Acharya Pandey et al., 2023; Kvestad et al., 2019; Li et al., 2020), lack of social support (Acharya Pandey et al., 2023; Yang et al., 2021), poor economic status (Ide-Okochi et al., 2022; Valladares-Garrido et al., 2022), unemployment (Yang et al., 2021), media exposure (He et al., 2018) and suffering from chronic illnesses (Li et al., 2020); as well as fear and guilt (Wang et al., 2020; Wang et al., 2018) are the most common determinants of mental disorders, especially PTSD and anxiety after an earthquake. On the other hand, a higher income, higher education level, a concentrated housing settlement after

an earthquake (Lu et al., 2020), and community-level social cohesion before the earthquake were found to be protective against mental disorders (Hikichi et al., 2016).

Moreover, the level of psychological and mental disorders in earthquake victims is highly associated with their level of resilience (Brown et al., 2019; Wahab et al., 2021; Xu & Ou, 2014). Despite the presence of physical and psychosocial injuries caused by the earthquake, resilience plays a protective role in mitigating the impact of the disaster on the mental health of survivors (Brown et al., 2019; Wahab et al., 2021). Resilience is the successful adaptation of an individual to adversity and stress (Rutter, 2012; Ungar, 2011). In other words, resilience denotes maintaining good mental well-being in the case of facing traumatic events or various stressors (Masten, 2021; Southwick et al., 2014). Data on the prevalence of PTSD and anxiety as well as the effect of resilience on these two mental illnesses after an earthquake is lacking in Afghanistan. This study aims to 1) assess the prevalence and associated factors of PTSD and anxiety among the victims of the earthquake in Zinda Jan; and 2). explore the association between resilience and the development of these two mental disorders among the victims.

MATERIALS AND METHODS

Design and setting

This community-based cross-sectional study was conducted in October and November of 2023, on earthquake survivors who resided in earthquake-hit villages of Zinda Jan in Herat province of Afghanistan.

Eligibility criteria

The eligibility criteria involved earthquake survivors who were over 17 years old, spoke the Dari language, lived in the Zinda Jan District of Herat province, and had no history of previous mental disorders.

Target population

The latest data from The National Statistics and Information Authority (2023) reveals that Zinda Jan was home to 68,001 people, 46.3% aged above 17 years, bringing the number of target population to 31,484

Study participants

Raosoft sample size calculator was used to estimate the sample size in this study (http://www.raosoft.com/sample_size.html). A minimum sample size of 380 was determined based on a 95% confidence level, a 95% confidence interval, and an expected response rate of 50%. We added 10% (38) more samples to the estimated sample size to compensate for any incorrect or incomplete responses. A convenient sampling strategy was employed to select participants in this study.

Data collection

Sociodemographic data were collected using a 21-item structured paper-based questionnaire. The questionnaire involved items on participant's gender, age, marital status, employment, education, economic status, health status, nutrition status, earthquake-related self or family injuries, loss of properties, and accessibility to social and government support services. In addition, we used the Dari-versions of GAD-7 questionnaire for collecting data on general anxiety disorders (GAD; Spitzer et al., 2006) PTSD Checklist for DSM-5 (PCL-5) for PTSD (Weathers et al., 2013) and the Connor-Davidson Resilience Scale-25 (CD-RISC-25;

Connor and Davidson (2003) for resilience. All data were collected by two clinical psychologists. Scoring and categorization of data were conducted using each instrument's guideline.

Statistical analysis

Data were recorded in IBM SPSS Statistics (version 27). Continuous variables with normal distribution are presented with mean and standard deviation (SD); non-normally distributed data are shown with median and interquartile range (IQR). Categorical variables are presented with numbers and percentages. A 2-sided chi-square (X^2) was employed to test for association between categorical variables. When the assumptions for a Chi-square test were not met, a Fisher exact test was performed. The significance level was set to 0.05 and the confidence interval to 95% in all calculations.

Ethical consideration

Data was collected from each participant after obtaining a written informed consent. The study protocol was approved by the Human Ethics Committee of Herat University (approval number #231018).

RESULTS

Sociodemographic characteristics of participants

A total of 418 cases with a mean age of 40.16 ± 14.17 years, including 206 (49.3%) males and 212 (50.7%) females were included in the study. The sociodemographic characteristics of study participants are presented in Table 1.

Table 1. Sociodemographic characteristics of study participants

Items	Numbers	Percentages
Gender		
Male	206	49.3
Female	212	50.7
Marital status		
Single	46	11.0
Married	372	89.0
Occupation		
Farmer	137	32.8
Housewife	211	50.5
Government employee	8	1.9
Self-employed	38	9.1
Unemployed	24	5.8
Education		
Illiterate	384	91.9
Literate	34	8.1
Economic status		

Poor	275	65.8
Fair	130	31.1
Good	13	3.1
Nutrition status		
Poor	319	76.3
Fair	92	22.0
Good	7	1.7
Health status		
Poor	112	26.8
Fair	142	34.0
Good	164	39.2
Access to health services		
Yes	43	10.3
Somewhat	199	47.6
No	176	42.1

Earthquake-related injuries and social support

Over two-thirds of study, participants suffered from physical injuries from the earthquake. Table 2 presents participant's earthquake- and social support-related data.

Table 2. Participant's earthquake and social support data

Physical injuries by earthquake		
Yes	289	69.1
No	129	30.9
What kind of physical injuries (n=289)		
Superficial	155	37.1
Severe	28	6.7
Fracture	101	24.2
Others	5	1.2
Impact of the earthquake on family members		
Yes	311	74.4
No	112	25.6
What kind of physical impact (n=311)		
Superficial	57	13.6
Severe	35	8.4
Fracture	83	19.9



Dead	136	32.5
Access to food, water, and social support after the earthquake		
Yes	342	81.8
No	76	18.2
Do you have a place for living?		
Yes	403	96.4
No	15	3.6
Status of your house after the earthquake		
Usable (partially damaged)	4	1.0
Non-usable (totally damaged)	414	99
Did you receive government support after the earthquake?		
Yes	223	53.3
No	195	46.7
Did you non-governmental support after the earthquake		
Yes	406	97.1
No	12	2.9
How many days after the main earthquake did you receive support?		
Day 1 and 2	132	31.6
Day 3 to 5	264	63.2
Second week	22	5.3
Are you overall happy about the social support after the earthquake?		
Yes	387	92.6
No	31	7.4

Prevalence of mental illnesses and resilience among study participants

GAD was detected in all (100%) participants, of whom 6 (1.4%), 29 (6.9%), and 383 (91.6%) had mild, moderate, and severe anxiety, respectively. Furthermore, 153 (36.6%), 134 (32.1%) and 131 (31.3%) participants reported mild, moderate and severe PTSD. As per resilience, 153 (36.6%) had low resilience, 142 (34.0%) had moderate resilience, and 123 (29.4%) had high resilience. There was a significant association between resilience and PTSD ($p=0.011$), but no significant association was observed between resilience and GAD ($p=0.515$).

Sociodemographic correlates of mental disorders and resilience

The association between sociodemographic factors with mental disorders and resilience is presented in Table 3.

Table 3. Sociodemographic correlates of mental disorders and resilience among study participants

Sociodemographic factors	GAD	PTSD	Resilience
Gender	0.004	0.091*	< 0.001 *
Marital status	0.027	0.645	0.427
Occupation	0.256	0.015	< 0.001
Education	1.000	0.275*	0.003 *
Economic status	0.264	0.300	< 0.001
Nutrition Status	0.569	0.007	0.006
Health status	0.092	0.791*	< 0.001 *
Access to Health Services	< 0.001	0.001 *	0.027 *

*. P-value presents the result of a Chi-square test.

All other p-values indicate the result of a Fisher exact test.

Earthquake-related correlates of mental disorders and resilience

A significant association was observed between GAD and physical injuries of family members, their type of injuries, and the participants' access to food, water, and social support. The association between PTSD and resilience with earthquake-related factors is shown in Table 4.

Table 4. Earthquake-related correlates of mental disorders and resilience among study participants

Sociodemographic factors	GAD	PTSD	Resilience
Suffering from physical injuries	0.060*	0.749*	< 0.001 *
Type of Injuries	0.566	0.652*	0.244*
Do your family members suffer from physical injuries?	< 0.001	< 0.001 *	0.753*
Type of family injuries	0.018	0.003 *	< 0.001 *
Access to food, water, and social services	0.015	0.066*	0.035 *
Do you have a living place?	1.000	0.156	0.026
Status of your house after the earthquake	1.000	0.379*	0.786*
Do you suffer from trauma after an earthquake?	0.127	0.233*	0.164*
Did you receive government support?	0.002	0.062*	< 0.001 *
Did you receive non-government support?	0.655	0.106	0.045
How many days after the earthquake did you receive support?	< 0.001	< 0.001 *	< 0.001 *
Are you overall happy with the support you received?	0.446	0.567*	0.115*

*. P-value presents the result of a Chi-square test.

All other p-values indicate the result of a Fisher exact test

DISCUSSION

This study aimed to assess the prevalence of GAD, PTSD, and resilience; as well as to determine the socio-demographic and earthquake-related correlates of these mental disorders among earthquake survivors in Zinda Jan District of Herat province, in 2023.

The overall prevalence of GAD in this study was found to be 100%. This is significantly higher than the rate of GAD reported in similar studies in Ecuador and Indonesia (Kvestad et al., 2019; Valladares-Garrido et al., 2022). This is not surprising because this study was conducted among survivors of earthquakes in villages of Zinda Jan district where frequent episodes of earthquakes hit the area and most serious damages and casualties have been reported due to the earthquake.

Furthermore, we found that PTSD was prevalent among all participants of this study. One-third of participants in this study were suffering from the symptoms of each mild, moderate and severe PTSD. while all participants had a score above 33. According to PCL-5 guideline for PTSD, any participant whose score is above 33 will benefit from treatment interventions (Li et al., 2018). Therefore, all participants in this study required urgent psychosocial and psychological counseling and psychiatric treatment to better cope with the dire situation after the earthquake.

We found that gender, marital status, and participants' access to health services were statistically significantly associated with GAD. Similar studies also reported a significant association between gender and GAD after the earthquake (Kvestad et al., 2019; Yang et al., 2021). Furthermore, physical injuries of family members, the type of injuries, participants' access to food, water, and social services, and time-lapse from the earthquake to the provision of social support were factors that were significantly associated with GAD, in this study. Many other studies also suggest that the suffering of family members (Kvestad et al., 2019), physical injuries (Marthoenis et al., 2019), and lack of social support (Acharya Pandey et al., 2023; Yang et al., 2021) were significant determinants of GAD among earthquake survivors.

This study also found that occupation, nutrition status, and access to health services are the correlates of PTSD among study participants. An association between employment and PTSD has been reported previously (Yang et al., 2021). The role of nutrition, especially certain vitamins and proteins on PTSD has been confirmed in many previous studies (Ahmed et al., 2020; Kim et al., 2021; Terock et al., 2020). Moreover, studies reveal that people's easy access to health services significantly reduces PTSD after the earthquake (Resnik et al., 2023). This shows that employment, good nutrition, and access to quality health services considerably reduce the prevalence of PTSD among earthquake survivors; therefore, government authorities, policymakers and public health implementers must work effectively in this regard. Furthermore, injuries of family members, the type of their injuries, and the time between the earthquake and social support were significantly associated with PTSD. Studies conducted elsewhere during the earthquake also reported a significant association between PTSD with family members' injuries and the time survivors received social support (Acharya Pandey et al., 2023; Kvestad et al., 2019; Marthoenis et al., 2019; Yang et al., 2021).

All sociodemographic factors in this study (except marital status) were associated with resilience. This is in accordance with many other studies that reported a significant association between resilience and gender, occupation, education, economic status, nutrition status, health status, and access to health services (Timalsina et al., 2021). This highlights the fact that resilience is a multidimensional factor that is defined by individual's various aspects of their lives.

Limitations

The diagnosis of GAD and PTSD was conducted via structured questionnaires, while the gold standard for the evaluation and diagnosis of mental disorders is a clinical evaluation. Moreover, this study was conducted among earthquake survivors in Zinda Jan district, where frequent episodes of earthquakes hit the area.

Recommendations

It is recommended that a study including a more comprehensive sample of people from all earthquake-hit areas of Herat province be conducted, and the diagnosis of mental disorders should be confirmed via standard clinical evaluation. Based on the preliminary findings of this study, it is highly recommended that the Public Health Directorate of Herat province and international non-governmental organizations focus on strategies that help strengthen the mental health of earthquake survivors in affected areas. These strategies may include public awareness, screening for mental disorders, treatment interventions, and psychological counseling.

CONCLUSION

The prevalence of PTSD and GAD among earthquake survivors in Zinda Jan district of Herat province was alarmingly high. A significant association was observed between resilience and PTSD but not with GAD. Results obtained in this study highlight the importance of mental health screening programs for early detection and intervention during earthquake crises.

Acknowledgment: The authors of the manuscript would like to extend their thanks to Mr. Muhammad Farzan Hosseini, Mrs. Qandigul Tajik from the United Nations Children Fund (UNICEF) child protection department in Herat, clinical psychologists, and Zinda Jan residents who consented to participate in this study.

Conflict of Interest: Authors of this manuscript declare no conflict of interest.

Funding: This project was funded by the International Assistance Mission (IAM) and the UNICEF, Tearfund UK, and United Methodist Committee on Relief (UMCOR); grant numbers: AFG/PCA2022253/-PD2023598, AFG00338-001/330281 and IDR102380IAM, respectively.

Role of funding source: The funding source had no role in study design, data collection, data analysis, manuscript preparation, and decision to publish.

Authors Contributions: A.R.N. Conceptualization, methodology, software, analysis, investigation, original draft preparation, review, and editing, supervision. M.A., N.A.M., S.J.S., E.A.A., T.H., T.R. and A.F.N. Conceptualization, methodology, original draft preparation, review, and editing. Conceptualization, methodology, original draft preparation, review, and editing.

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