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Post-earthquake health-related quality of life in Afghanistan: a cross- sectional study

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Research Article

Keywords: Earthquake, Afghanistan, HRQoL, WHOQOL-BREF, Mental health, Disaster recovery

Posted Date: March 12th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-8863086/v1

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Additional Declarations: No competing interests reported.

Abstract

Background: Earthquakes are among the most destructive natural disasters, causing severe physical, psychological, and social disruption. Assessing health-related quality of life (HRQoL) among survivors is essential for evidence-based recovery planning, particularly in resource-limited settings such as Afghanistan. This study evaluated HRQoL and its sociodemographic and clinical determinants among survivors of the 2023 Herat earthquake.

Methods: A community-based cross-sectional study was conducted among 902 adult survivors in five earthquake-affected districts of Herat Province. Data were collected through structured face-to-face interviews between February and March 2024. HRQoL was assessed using the WHOQOL-BREF, and associations between HRQoL domains (physical, psychological, social, environmental) and independent variables were analyzed using chi-square tests.

Results: Low HRQoL was reported by 38.3% of participants in the physical domain, 36.7% in the psychological domain, 28.3% in the environmental domain, and 25.7% in the social domain. Women reported significantly lower physical (44.2% vs. 30.3%; p = 0.002) and psychological (42.4% vs. 29.5%; p = 0.006) HRQoL compared with men. Widowed/divorced individuals had the highest prevalence of low HRQoL (physical: 51.5%; psychological: 48.5%; p < 0.001). Participants from households with >10 members reported nearly double the prevalence of low physical HRQoL compared with those from ≤5-member households (49.2% vs. 26.8%; p < 0.001). Low monthly income (<10,000 AFN), unemployment, chronic illness (physical: 56.8% vs. 33.5%; p < 0.001), and earthquake-related injuries (52.3% vs. 34.1%; p < 0.01) were also significantly associated with impaired HRQoL.

Conclusion: Survivors of the Herat earthquake experienced substantial impairments in physical and psychological well-being. Women, widowed/divorced individuals, low-income households, and those with injuries or chronic illnesses were disproportionately affected. Targeted psychosocial support, economic assistance, and long-term rehabilitation strategies are urgently required to improve HRQoL and strengthen community resilience in earthquake-affected regions.

Introduction

Earthquakes are natural disasters that occur with significant frequency and magnitude globally, posing substantial threats to human life and well-being, particularly in low- and middle-income countries (LMICs) .(1, 2) These seismic events often lead to immediate public health crises, characterized by widespread injuries, fatalities, and critical disruptions to essential health services. Beyond the immediate aftermath, earthquakes also inflict profound long-term public health consequences, including severe mental health impacts such as post-traumatic stress disorder (PTSD), anxiety, and depression, as well as mass displacement and significant compromise of health-related quality of life (HRQoL) among survivors .(3, 4, 5, 6).

HRQoL is a multidimensional construct that encompasses an individual's subjective perception of their physical, psychological, social, and environmental well-being, extending beyond mere survival to capture the broader impact of health conditions and life circumstances on daily functioning and overall satisfaction.(7) It is a crucial outcome measure in disaster contexts because it reflects the enduring challenges faced by affected populations in regaining normalcy and achieving a satisfactory standard of living (8)(9). Evidence from diverse post-earthquake settings consistently shows that HRQoL is substantially compromised. Studies in Turkey, Pakistan, India, Iran, and China have demonstrated that physical and psychological domains are often the most severely affected, frequently intertwined with PTSD and other mental-health conditions. (3, 4, 5, 6, 10). For instance, a study two years after the Jiuzhaigou earthquake in a minority area of China revealed significant HRQoL impairments, with mental health domains particularly affected due to high prevalence of PTSD (5), and similarly, a study conducted 10 years after the Wenchuan earthquake in China indicated that post-traumatic status, particularly PTSD, significantly influenced HRQoL (6). In Iran, older survivors of the Bam earthquake had compromised HRQoL five years after the disaster, underscoring age-related vulnerability and the need for tailored recovery policies.(10) Similarly, among older adults who experienced the 2017 Pohang earthquake in South Korea, HRQoL was significantly impacted, with associated factors including age, sex, and socioeconomic status (4). This is further supported by findings from a multi-country study in South Asia, which, while focusing on severe mental illness, underscores how socioeconomic and health-related factors critically interact to shape HRQoL in LMICs. Factors such as low socioeconomic status, illiteracy, insufficient healthcare providers, and lack of effective drugs contribute to lower HRQoL in vulnerable populations (8).

The study by Liang and Lu (2014) in Sichuan Province, China, highlighted the role of adaptation to harsh conditions in post-earthquake HRQoL, emphasizing the importance of social support and community resilience (11). Furthermore, Liang and Wang also demonstrated that post-earthquake rescue policies in Sichuan, China, positively influenced survivors' HRQoL, underscoring the role of government interventions in recovery. (12)

Afghanistan, a country frequently affected by earthquakes, presents a unique and particularly vulnerable context for studying HRQoL. The nation experiences frequent seismic activity, often leading to devastating consequences. For example, the recent series of earthquakes in Herat province, beginning in October 2023, caused widespread destruction, claiming thousands of lives and displacing entire communities, exacerbating an already dire humanitarian situation.(13, 14, 15) Another significant event was the 2022 earthquake in Paktika and Khost provinces, which resulted in over 1,000 fatalities and left tens of thousands homeless, highlighting the immense and repetitive impact of these disasters(16). The country's protracted conflict, weak healthcare infrastructure, and ongoing humanitarian crises further compound the vulnerabilities of its population to natural disasters (17). Displaced populations, such as Afghan refugees in Quetta, Pakistan, also experience compromised HRQoL influenced by socio-demographic factors, underscoring the broader regional challenges (18). Women and children are disproportionately affected in such crises, facing heightened risks and barriers to recovery. Despite the

high frequency and severe impact of earthquakes in Afghanistan, there is a notable dearth of published evidence specifically examining post-earthquake HRQoL within this context.

Given these critical gaps, this study aims to assess the HRQoL among individuals affected by recent earthquakes in Herat, Afghanistan, this research will also investigate the socio-demographic factors associated with HRQoL in this highly vulnerable population, providing crucial insights to inform humanitarian response and long-term recovery efforts.

Materials and Methods

Participants, Study Design, and Procedure

This cross-sectional study was conducted in 2024 and involved 902 participants aged between 15 and 78 years. The participants were recruited from Herat province, Afghanistan. Data collection was carried out through face-to-face interviews conducted by five trained data collectors. A cluster convenience sampling method was employed, whereby 1,500 individuals residing in Herat province were approached near their residential or workplace areas. Out of these, 902 individuals consented to participate in the study.

Participants were required to meet specific eligibility criteria: they had to be (i) residents of Afghanistan, (ii) proficient in either Dari or Pashto, and (iii) capable of providing informed consent, either in written or verbal form.

Instruments

The study utilized a structured survey divided into two sections. The first section gathered socio-demographic information, including age, marital status, education level, number of children, residency, and monthly family income. Additionally, participants were asked if they had experienced a "bad event" in the past month, defined as any incident that made them feel down or distressed; the interpretation of what constituted a “bad event” was left to the participants' discretion.

The second section assessed participants' quality of life using the 26-item Dari version of the World Health Organization's Quality of Life-Bref (WHOQOL-Bref 26) instrument. This tool evaluates four domains of quality of life: physical health, psychological health, social relationships, and environment. Each item (e.g., “To what extent do you feel that physical pain prevents you from doing what you need to do?”) was rated on a five-point Likert scale ranging from 1 (“not at all”) to 5 (“an extreme amount”). Raw scores were subsequently converted to a 0–100 scale for consistency with the WHOQOL-100. Scores below 46 were classified as indicating low quality of life, scores between 46 and 65 indicated moderate quality of life, and scores above 65 reflected high quality of life.

Analysis

Data entry was conducted using Microsoft Excel 2016, while statistical analyses were performed using IBM SPSS version 27.0 for Windows. Descriptive statistics such as means, standard deviations, frequencies, and percentages were used to summarize the data. Chi-square tests were employed to assess associations between variables, and multiple regression analysis was conducted to identify independent socio-demographic factors associated with sleep disturbances and quality of life. Statistical significance was determined using a two-tailed p-value of less than 0.05.

Results

The study sample consisted of 902 participants, with a majority aged 15–34 years (53.9%), while 46.1% were aged 35–78 years. Females comprised 69.1% of the sample, whereas males accounted for 30.9%. Regarding marital status, most participants were married (71.6%), followed by single individuals (19.1%) and those who were widowed or divorced (9.3%). The number of children varied, with 50.1% having 1–5 children, 25.9% having none, and 23.9% reporting more than five children. Residency distribution indicated that 60.5% lived in Herat city, while 39.5% resided in the epicenter. Educational attainment showed that 44.1% were illiterate, 13.7% had completed primary school, 14.1% secondary school, 20.1% high school, and 8.0% had university education. Most participants reported low family income (71.7%), while 22.9% had middle income and only 5.3% reported high income. Additionally, 93.0% of the sample experienced a bad event in the past month, with only 7.0% reporting no such event. **[Table 1]**

The association between participants' characteristics and their physical domain of quality of life revealed several significant findings. Age group showed a strong correlation, with older participants (35–78 years) having a higher proportion of low physical quality of life (30.5%) compared to younger participants (15–34 years) at only 5.8% ($p < .001$). Gender differences were also evident, with females experiencing a higher prevalence of low (19.6%) and medium (25.8%) physical quality of life compared to males (11.8% and 12.9%, respectively; $p < .001$). Marital status significantly influenced outcomes, as widowed/divorced individuals had the highest proportion of low physical quality of life (42.9%) compared to married (17.8%) and single participants (2.3%) ($p < .001$). Participants with more than five children reported notably higher rates of low (43.5%) and medium (32.4%) physical quality of life ($p < .001$). Education was also a significant factor, with illiterate participants showing the highest rate of low physical quality of life (28.6%), whereas those with high school education had the highest proportion of high physical quality of life (87.8%) ($p < .001$). Residency, family income, and experiencing a bad event in the past month were not significantly associated with physical quality of life ($p = .522$, .272, and .315, respectively). **[Table 2]**

The analysis of the association between participants' characteristics and their psychological domain of quality of life revealed several significant findings. Age showed a strong correlation, with older participants (35–78 years) having a higher proportion of low psychological quality of life (32.0%) compared to younger participants (15–34 years) at 13.0% ($p < .001$). Females were more likely to report low (27.6%) and medium (28.4%) psychological quality of life than males (8.6% and 31.5%, respectively; $p < .001$). Marital status was also significantly associated, with widowed/divorced individuals reporting

the highest rate of low psychological quality of life (61.9%), compared to married (19.2%) and single participants (11.6%) ($p < .001$). Participants with more than five children experienced the highest rates of low (38.0%) and medium (41.7%) psychological quality of life ($p < .001$). Education significantly influenced outcomes, with illiterate participants reporting the highest rate of low psychological quality of life (29.4%), whereas those with high school education had the highest proportion of high psychological quality of life (75.7%) ($p < .001$). Residency, family income, and experiencing a bad event in the past month were not significantly associated with psychological quality of life ($p = .224$, .070, and .149, respectively). [Table 3]

The analysis of the association between participants' characteristics and their social-relationship domain of quality of life revealed several significant findings. Gender showed a strong correlation, with females experiencing higher rates of low (15.2%) and medium (27.0%) social-relationship quality of life compared to males (3.2% and 21.1%, respectively; $p < .001$). Marital status was also significantly associated, as widowed/divorced individuals reported the highest proportion of low (38.1%) and medium (51.2%) social-relationship quality of life compared to married and single participants ($p < .001$). Participants with more than five children had notably higher rates of low (12.5%) and medium (33.3%) social-relationship quality of life compared to those with fewer or no children ($p < .001$). Residency was significant as well, with participants from Herat city showing higher rates of low social-relationship quality of life (14.1%) compared to those from the epicenter (7.6%) ($p < .001$). Education also played a significant role, where illiterate participants had a higher proportion of low social-relationship quality of life (12.1%) compared to those with high school education (5.5%) ($p = .002$). Monthly family income was significantly associated, with low-income participants reporting lower social-relationship quality of life compared to higher-income groups ($p = .039$). Conversely, age group and experiencing a bad event in the past month were not significantly associated with social-relationship quality of life ($p = .161$ and .191, respectively). **[Table 4]**

The analysis of the association between participants' characteristics and their environment domain of quality of life revealed several significant findings. Age was significantly associated with environmental quality of life, with older participants (35–78 years) reporting higher rates of low (15.1%) and medium (55.8%) environmental quality of life compared to younger participants ($p = .012$). Gender differences were notable, with females experiencing higher rates of low (17.5%) and medium (57.9%) environmental quality of life than males (4.3% and 40.5%, respectively; $p < .001$). Marital status showed a significant impact, where widowed/divorced individuals reported the highest proportion of low (23.8%) and medium (65.5%) environmental quality of life ($p < .001$). Participants with more than five children reported the highest proportion of low (16.7%) and medium (55.6%) environmental quality of life ($p = .007$). Residency was also a significant factor, with participants from Herat city reporting higher rates of low environmental quality of life (15.0%) compared to those from the epicenter (11.0%) ($p = .021$). Education played a role, with illiterate participants showing the highest proportion of low environmental quality of life (14.3%), while those with high school education reported the highest proportion of high environmental quality of life (43.1%) ($p = .002$). Monthly family income was strongly associated with environmental quality of life, with low-income participants reporting the highest rates of low (12.5%) and

medium (56.9%) environmental quality of life ($p < .001$). Conversely, experiencing a bad event in the past month was not significantly associated with environmental quality of life ($p = .780$). **[Table 5]**

Discussion

This cross-sectional study investigating health-related quality of life (HRQoL) among 902 earthquake survivors in Herat, Afghanistan assessed physical, psychological, social relationships, and environmental domains, revealing significant disparities across various socio-demographic factors. By Utilizing Dari version of the World Health Organization Quality of Life-BREF (WHOQOL-BREF) questionnaire. (19). The findings indicate that women, older adults (35–78 years), widowed/divorced individuals, those with more than five children, and those with low education and low income are disproportionately affected by poor HRQoL following the earthquake. Interestingly, experiencing a "bad event" in the past month did not significantly impact HRQoL in any domain.

In the physical domain, older participants (35–78 years) were over five times more likely to report low HRQoL (30.5% vs 5.8%, $p < 0.001$) compared to their younger counterparts. This aligns with existing literature demonstrating that older adults are particularly vulnerable in disaster contexts, often experiencing worse survivorship outcomes due to pre-existing health conditions, reduced mobility, and limited access to resources (10)(20)(21). For instance, a study on Bam earthquake survivors found that older people faced significant challenges in maintaining a high quality of life five years post-disaster (10). Widowed/divorced individuals exhibited the highest rates of low HRQoL in the physical domain (42.9%), which could be attributed to the cumulative stress of bereavement, social isolation, and financial strain, all of which can severely impact physical well-being. Furthermore, individuals with more than five children showed a 43.5% low HRQoL, potentially reflecting increased caregiving burdens and resource allocation challenges within larger households, which can detract from personal health and recovery efforts (22). Conversely, a high-school education was associated with 87.8% high HRQoL ($p < 0.001$), suggesting that educational attainment may confer protective factors such as better health literacy, improved coping strategies, and enhanced access to information and support networks (23).

The psychological domain highlights significant gender disparities, with women experiencing nearly three times more low HRQoL (27.6% vs 8.6%, $p < 0.001$) than men. This is consistent with broader research indicating that women often report higher rates of post-traumatic stress disorder (PTSD) and general anxiety disorder (GAD) following traumatic events (6)(24)(25). For instance, studies on earthquake survivors in Turkey and China have consistently shown a negative impact of traumatic events on psychological well-being and an increased prevalence of mental health issues, with gender often emerging as a significant factor (5)(6)(22)(25). Widowed/divorced individuals also had a high rate of low psychological HRQoL (61.9%), underscoring the severe mental health consequences of marital loss compounded by disaster trauma (26)(27). This points to the critical need for gender-sensitive and bereavement-informed mental health interventions in post-disaster settings.

In the social relationships domain, women demonstrated five times the rate of low HRQoL compared to men (15.2% vs 3.2%, $p < 0.001$), and widowed/divorced individuals faced a 38.1% low HRQoL. These findings suggest that traditional social support systems, which are crucial for recovery, may be severely disrupted for these groups (28)(29). Living in Herat city was also associated with worse social HRQoL (14.1% vs 7.6%, $p < 0.001$). This could be attributed to a diminished sense of community or greater social fragmentation in urban environments compared to potentially more cohesive rural communities, where social networks might be stronger (30). The concept of social vulnerability, encompassing factors like lack of social support and community cohesion, has been shown to significantly impact quality of life among various populations, including cancer survivors (28)(31)(32). The breakdown of social networks can exacerbate feelings of isolation and reduce access to informal support, hindering the recovery process.

The environmental domain similarly revealed that women experienced four times the rate of low HRQoL compared to men (17.5% vs 4.3%, $p < 0.001$). Low income and low education were strong predictors of poorer scores, and older age and Herat city residency were also significant. Environmental HRQoL encompasses aspects such as physical safety, financial resources, access to healthcare, and home environment (33). Disasters disproportionately affect individuals with limited economic resources and educational opportunities, as they often reside in less resilient housing and have fewer means to rebuild their lives (23)(34). The observation that urban residency is linked to lower environmental HRQoL might indicate inadequate access to post-disaster infrastructure, housing, and public services within the city, or possibly heightened exposure to environmental stressors such as noise or overcrowding in temporary shelters. For example, studies highlight the significant loss to healthcare networks and reduced accessibility to medical services in post-earthquake scenarios, especially in urban areas (35).

A notable finding was the non-significance of experiencing a "bad event" in the past month across all domains. This contrasts with many post-disaster studies that emphasize acute stress responses and immediate psychological distress (6)(27). This could imply that for survivors in Herat, the long-term, chronic stressors related to the earthquake's aftermath—such as displacement, loss of livelihood, and ongoing instability—might overshadow the impact of more recent, acute negative events. Alternatively, it might reflect a degree of normalization or adaptation to adverse conditions in a prolonged crisis context. It is also possible that culturally specific coping mechanisms or reporting biases might influence this particular finding.

Limitation: The study's focus on Herat, while providing valuable local insights, limits the generalizability of the findings to other regions of Afghanistan or different disaster contexts.

Conclusion and Recommendations

The findings underscore the urgent need for targeted and tailored humanitarian interventions. Firstly, relief efforts must prioritize the most vulnerable groups: women, older adults, widowed/divorced

individuals, and those with low income and education. This includes providing immediate and sustained support for housing, food security, and healthcare. Secondly, gender-sensitive programming is paramount, recognizing the unique burdens faced by women in all aspects of HRQoL. This should involve creating safe spaces, ensuring access to resources, and empowering women in decision-making processes during recovery. Thirdly, mental health and psychosocial support services must be integrated into primary healthcare, with a particular focus on addressing the psychological distress of widowed/divorced individuals and women. Lastly, long-term development strategies should focus on enhancing educational opportunities and economic empowerment, as these factors are crucial protective elements for HRQoL in post-disaster settings. Future research should transition to longitudinal designs to monitor HRQoL trajectories and identify critical periods for intervention. It is imperative to investigate the interplay between chronic post-disaster stressors and acute "bad events" to better understand their differential impacts on HRQoL. Qualitative studies using in-depth interviews and focus groups could provide a richer understanding of survivors' lived experiences, coping mechanisms, and culturally specific resilience factors. Such research could also explore the specific reasons behind the observed urban-rural disparities in social and environmental HRQoL. Expanding geographic scope beyond Herat to other affected areas in Afghanistan would provide a broader picture of post-earthquake challenges.

Declarations

Ethical Considerations

This study was conducted in collaboration with the Herat Health Department and the Afghanistan Center for Epidemiological Studies (ACES) and received ethical approval from the ACES Ethical Review Committee (Approval No. ACES-HES-23-002). Written informed consent was obtained from all adult participants, with parental consent for minors. Participation was voluntary, with the right to withdraw at any time. Data were anonymized, securely stored, and handled in accordance with the Declaration of Helsinki.

Conflict of interest

The authors assert that there are no conflicts of interest to disclose.

Author contributions

- AN and AQM designed the study.
- MN, MnN, and HA contributed to the data collection of this study.
- AN analyzed the data.
- SD, FR, and NR prepared the draft of the manuscript.

- AN critically reviewed, rewrote, edited, and finalized the manuscript.
- All authors reviewed the manuscript.

Funding

This research received no external funding.

Consent for publication

Not applicable.

Clinical trial number

Not applicable.

Data availability

The datasets utilized and/or analyzed in the course of the present study are accessible from the corresponding author upon reasonable inquiry.

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Tables

Tables 1 to 5 are available in the supplementary files section

Supplementary Files

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