



REVIEW ARTICLE



Post-Traumatic Stress Disorder Following Earthquakes: A Review of Risk and Protective Factors and Psychosocial Interventions

Depremler Sonrası Travma Sonrası Stres Bozukluğu: Risk ve Koruyucu Faktörler ile Psikososyal Müdahaleler Üzerine Bir Derleme

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ABSTRACT

Earthquakes may cause substantial and persistent psychological consequences alongside physical destruction. Post-traumatic stress disorder (PTSD) is a major mental health problem following earthquakes. This review examines post-earthquake PTSD with a focus on risk factors, protective factors, and psychosocial interventions. Severe trauma exposure, physical injury, bereavement, displacement, pre-existing mental health problems, economic hardship, and limited social support may increase PTSD risk. Social support, adaptive coping, access to basic needs, and community ties may facilitate recovery. Post-earthquake mental health care should extend beyond clinical treatment. Early psychosocial support, follow-up of high-risk groups, specialized treatment when needed, and community-based services are essential components of care. Integrating mental health services into disaster preparedness, response, and long-term recovery may strengthen continuity and accessibility of care.

ÖZET

Bu çalışma deprem sonrası travma sonrası stres bozukluğuna (TSSB) ilişkin literatürü risk ve koruyucu etmenler ile psikososyal müdahaleler açısından değerlendirmek amacıyla hazırlanmıştır. Çalışma anlatsal derleme niteliğindedir. Türkiye’de ve farklı ülkelerde yürütülen deprem araştırmaları ile afet ruh sağlığı ve kitlesel travma müdahalelerine ilişkin çalışmalar ve başlıca rehberler incelenmiştir. Travmaya yoğun maruziyet, fiziksel yaralanma, yakın kaybı, yerinden edilme, önceki ruhsal sorunlar, ekonomik güçlükler ve sınırlı sosyal destek TSSB riskini artıran başlıca etmenlerdir. Sosyal destek, işlevsel başa çıkma, temel gereksinimlere erişim ve toplumsal bağların korunması iyileşmeyi destekleyen etmenler olarak öne çıkmaktadır. Deprem sonrası ruh sağlığı hizmetleri klinik tedaviyle sınırlı kalmamalıdır. Erken psikososyal destek, riskli grupların izlenmesi, gerektiğinde uzmanlaşmış tedavi ve uzun dönemli toplum temelli hizmetler birlikte yürütülmelidir. Afet ruh sağlığı hizmetlerinin hazırlık, müdahale ve iyileşme süreçlerine bütünleşik biçimde dahil edilmesi önerilmektedir.

Anahtar Sözcükler: Deprem, travma sonrası stres bozukluğu, afet ruh sağlığı

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1. Introduction

Post-traumatic stress disorder (PTSD) is a mental health condition that may develop after exposure to a traumatic event and may impair daily functioning, interpersonal relationships, and broader psychosocial adjustment (Korucu & Kaya, 2023). Earthquakes create a distinctive context of risk for PTSD. Sudden onset, threat of death or injury, bereavement, housing damage, and recurrent aftershocks may occur within the same period. The psychological impact of an earthquake is not determined solely by the magnitude of physical destruction. Degree of exposure, pre-existing mental health problems, social support, socioeconomic conditions, and persistent post-disaster stressors also shape psychological outcomes (Aker, 2006; Neria et al., 2008; North et al., 2013).

The post-earthquake period may generate additional sources of stress. Housing instability, displacement, loss of income, restricted access to health services, and uncertainty about the future may prolong recovery (Xu & Song, 2011; Tang et al., 2014). Studies conducted after the Marmara and Van earthquakes in Türkiye identified traumatic stress symptoms as an important post-disaster mental health concern (Aker, 2006; Başoğlu et al., 2004; Kurt & Gülbahçe, 2019). Research following the Kahramanmaraş earthquake has also drawn attention to psychological consequences extending beyond those directly exposed to the disaster (Gören, 2023).

Post-earthquake PTSD cannot be explained by a single determinant. The nature of traumatic exposure, pre-disaster vulnerabilities, and post-disaster living conditions all contribute to its development and persistence. This review aims to evaluate the current literature on post-earthquake PTSD through the domains of risk and protective factors and psychosocial interventions. Studies conducted in Türkiye and other countries, together with key literature and guidance on disaster mental health and mass-trauma intervention, are considered. The review focuses on the clinical and psychosocial manifestations of PTSD after earthquakes, risk and protective factors, intervention options, access to services, and continuity of care.

2. Earthquakes and Post-Traumatic Stress Disorder

The traumatic nature of an earthquake extends beyond the moment of ground shaking. Threat to life, entrapment under debris, physical injury, bereavement, and loss of housing may occur within the same event. Recurrent aftershocks may delay the restoration of a sense of safety. Earthquakes may therefore acquire the character of an ongoing traumatic experience rather than a discrete event confined to a single point in time (Başoğlu et al., 2004; Neria et al., 2008).

The prevalence of PTSD is not uniform across earthquake-affected populations. Severity of exposure, sample characteristics, timing of assessment, and measurement procedures contribute to variation in reported rates. Epidemiological studies conducted after the 1999 earthquakes in Türkiye documented substantial levels of PTSD and comorbid depressive symptoms (Aker, 2006; Başoğlu et al., 2004). Research involving adolescents and adults after the Wenchuan earthquake similarly showed that post-traumatic stress, depression, and anxiety may coexist after major earthquakes (Fan et al., 2011; Kun et al., 2013; Xu & Song, 2011). Assessments conducted 30 months after the Haiti earthquake further demonstrated that psychological consequences may persist well beyond the immediate aftermath (Cénat & Derivois, 2014).

The DSM-5 organizes PTSD symptoms into four clusters: intrusion symptoms, avoidance, negative alterations in cognition and mood, and alterations in arousal and reactivity (American Psychiatric Association, 2013). Following an earthquake, sounds, vibrations, damaged buildings, and images associated with the disaster area may function as trauma reminders. Clinical assessment should not be limited to symptom counts. Symptom persistence, severity, and effects on social and occupational functioning require concurrent evaluation.

3. Risk and Protective Factors

3.1. Risk Factors

Direct and severe traumatic exposure is among the most consistently identified risk domains for PTSD. Proximity to the epicenter, physical injury, witnessing death or severe injury, and substantial material loss have been associated with higher levels of post-traumatic stress symptoms (Lai et al., 2004). Research across different disasters likewise identifies the nature of exposure and the extent of loss as central variables in disaster-related PTSD (North et al., 2013).

Age, gender, and socioeconomic status have been associated with differences in risk in some samples. Evidence from the Wenchuan earthquake indicates that the effects of demographic characteristics should be interpreted alongside trauma exposure and other contextual conditions (Kun et al., 2013). Demographic characteristics therefore appear insufficient as stand-alone explanations of post-disaster PTSD.

Pre-existing mental health problems and previous traumatic experiences may increase vulnerability. Persistent post-disaster stressors may also contribute to the maintenance of PTSD symptoms. Displacement, loss of livelihood, housing problems, and weak social support directly shape life after an earthquake (Xu & Song, 2011). Meta-analytic evidence on depression after natural disasters similarly supports the relevance of loss, exposure, and post-disaster adversity to adverse psychological outcomes (Tang et al., 2014).

3.2. Protective Factors

Social support is a major resource in post-earthquake recovery. Support from family members, friends, and close social networks may contribute to the restoration of safety and belonging. A one-year follow-up study of earthquake survivors in Türkiye demonstrated the relevance of social support to PTSD outcomes (Altındağ et al., 2005).

Safety, calming, individual and collective efficacy, connectedness, and hope have been proposed as core principles of intervention following mass trauma (Hobfoll et al., 2007). These principles reflect a model of recovery extending beyond the reduction of clinical symptoms. Feeling safe, maintaining social relationships, and regaining a sense of control over everyday life are integral components of psychological recovery.

Coping strategies also influence adaptation. Active problem solving, meaning-making, and religious coping have been associated with resilience in some disaster-affected populations (Rajkumar et al., 2008). Individual coping capacity cannot be separated from environmental conditions. Access to housing, health care, economic security, and psychological support provides the material foundation on which recovery takes place (Wang et al., 2009).

4. Psychosocial Intervention and Recovery

Post-earthquake mental health care extends beyond treatment for individuals who meet diagnostic criteria for PTSD. Disaster-affected populations present with needs of varying intensity. Basic safety and social support needs and specialized psychiatric treatment should be addressed at different levels within the same system of care. The Inter-Agency Standing Committee (2007) recommends a layered model for organizing mental health and psychosocial support in emergency settings.

Access to care is a major concern during disasters. Shortages of mental health professionals, disruption of health infrastructure, and economic constraints may restrict access to appropriate support (World Health Organization, 2013). Stigma may further reduce help-seeking behavior (Cénat & Derivois, 2014). A systematic review of mental health programs implemented after the Haiti earthquake documented substantial variation in interventions and emphasized the importance of adapting programs to local conditions (Cénat et al., 2020).

Training non-specialist health and community workers in basic psychological interventions may expand service capacity (Patel et al., 2011). This approach is particularly relevant where specialist human resources are limited. Mobile health, teletherapy, and internet-based interventions may provide additional channels of care when physical access is disrupted (Ruzek & Yeager, 2017). Digital interventions require attention to internet access, privacy, and digital literacy.

Controlled studies have also evaluated trauma-focused treatments in earthquake survivors. A randomized waiting-list controlled trial of a single-session behavioral treatment for earthquake-related PTSD in Türkiye reported evidence of clinical benefit from a structured intervention (Başoğlu et al., 2007). A pilot study of narrative exposure therapy among adult survivors of the Sichuan earthquake likewise provided evidence supporting the potential use of trauma-focused treatment in disaster settings (Zang et al., 2013). Treatment selection should be based on clinical need, symptom duration and severity, comorbid conditions, and the individual's living circumstances.

Embedding disaster mental health within preparedness planning strengthens continuity of care. Coordination among mental health services, primary health care, social services, and disaster management may improve early identification and referral (Math et al., 2015). The disappearance of temporary services after the acute phase represents a significant systems-level problem. Post-disaster reconstruction can also provide an opportunity to strengthen mental health services on a more sustainable basis (Epping-Jordan et al., 2015; World Health Organization, 2013).

5. Discussion

The literature on post-earthquake PTSD points to two distinct but closely related levels of risk. The first concerns the traumatic event itself. Physical injury, threat to life, bereavement, and intense exposure increase the likelihood of adverse psychological outcomes. The second concerns post-disaster living conditions. Problems related to housing, income, social support, and access to health care may prolong the effects of trauma. A narrow understanding of PTSD as an individual clinical response to a traumatic event obscures this second level.

Risk factors do not carry equal explanatory weight. Direct exposure and severe loss show a more consistent association with PTSD, whereas the effects of demographic variables vary across samples and contexts (Lai et al., 2004; Kun et al., 2013; North et al., 2013). Risk assessment should not be reduced to a fixed checklist of individual characteristics. What the person experienced, which resources were lost, and the conditions under which life continues after the disaster require joint consideration.

Research on protective factors underscores the importance of the social environment. Social support, connectedness, safety, and perceived efficacy occupy a central place in recovery (Altındağ et al., 2005; Hobfoll et al., 2007). A mental health response restricted to symptom reduction leaves these domains insufficiently addressed. Safe housing, access to essential services, and restoration of social ties are inseparable from clinical recovery.

Findings from the Marmara and Van earthquakes in Türkiye indicate that disaster mental health requires long-term follow-up (Aker, 2006; Kurt & Gülbahçe, 2019). More recent research also points to the need to consider secondary traumatic effects of disasters (Gören, 2023). A service model concentrated solely on the first weeks after an earthquake is inadequate. High-risk groups require follow-up, access to specialized treatment, and sustained community-based support.

The resilience of the service system is a separate concern. Short-term programs introduced from outside the affected area may provide valuable support during the acute phase, but their impact remains limited when they fail to build lasting local capacity. Training local personnel, establishing coordination with primary care and social services, developing referral pathways, and explicitly incorporating mental health into disaster plans provide a more sustainable structure (Epping-Jordan et al., 2015; Math et al., 2015; World Health Organization, 2013). The effects of research procedures on disaster-affected participants also warrant attention. Ethical sensitivity and participant safety should form part of research design when data are collected after traumatic events (Galea et al., 2007).

6. Conclusion and Recommendations

Post-earthquake PTSD is a multifactorial mental health problem. Severe traumatic exposure, physical injury, bereavement, displacement, pre-existing mental health problems, and persistent post-disaster adversity may increase risk. Social support, access to basic necessities, adaptive coping, and preservation of community ties support recovery.

Disaster mental health services should begin with early psychosocial support, continue through systematic follow-up of high-risk groups, and provide access to evidence-based treatment when clinically indicated. Mental health care should not be planned separately from disaster management. Primary health care, social services, and local support mechanisms should operate within an integrated system. Long-term follow-up and the development of local service capacity should constitute core components of post-disaster mental health policy.

Declarations

Ethics Approval. Ethics approval was not required for this study, as it is a review article based exclusively on previously published literature and did not involve human participants, animals, or the collection of primary data.

Informed Consent. Not applicable, as the study did not involve human participants or the collection of identifiable personal information.

Conflict of Interest. The author declares no conflict of interest.

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Data Availability. No new data were generated or analyzed in this study. All information used in the review was obtained from the published literature cited in the article.

Author Contributions. The author was responsible for the conceptualization, literature review, analysis and interpretation of the literature, preparation of the original draft, and review and editing of the manuscript. The author read and approved the final version of the manuscript.

References

- Aker, T. (2006). 1999 Marmara depremleri: epidemiyolojik bulgular ve toplum ruh sağlığı uygulamaları üzerine bir gözden geçirme. *Türk Psikiyatri Dergisi*, 17(3), 204-212.
- Altındağ, A., Özen, S., & Sır, A. (2005). One-year follow-up study of posttraumatic stress disorder among earthquake survivors in Turkey. *Comprehensive Psychiatry*, 46(5), 328-333.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). American Psychiatric Publishing.
- Baçoğlu, M., Kılıç, C., Şalcıoğlu, E., & Livanou, M. (2004). Prevalence of posttraumatic stress disorder and comorbid depression in earthquake survivors in Turkey: An epidemiological study. *Journal of Traumatic Stress*, 17(2), 133-141.
- Baçoğlu, M., Şalcıoğlu, E., Livanou, M., Kalender, D., & Acar, G. (2007). Single-session behavioral treatment of earthquake-related posttraumatic stress disorder: A randomized waiting list controlled trial. *Journal of Traumatic Stress*, 20(1), 1-11.
- Cénat, J. M., & Derivois, D. (2014). Assessment of prevalence and determinants of posttraumatic stress disorder and depression symptoms in adults survivors of earthquake in Haiti after 30 months. *Journal of Affective Disorders*, 159, 111-117.
- Cénat, J. M., Mukunzi, J. N., Noorishad, P. G., Rousseau, C., Derivois, D., & Bukaka, J. (2020). A systematic review of mental health programs among populations affected by the 2010 earthquake in Haiti. *Journal of Affective Disorders*, 263, 227-238.
- Epping-Jordan, J. E., van Ommeren, M., Ashour, H. N., Maramis, A., Marini, A., Mohanraj, A., et al. (2015). Beyond the crisis: Building back better mental health care in 10 emergency-affected areas using a longer-term perspective. *International Journal of Mental Health Systems*, 9(1), 15.
- Fan, F., Zhang, Y., Yang, Y., Mo, L., & Liu, X. (2011). Symptoms of posttraumatic stress disorder, depression, and anxiety among adolescents following the 2008 Wenchuan earthquake in China. *Journal of Traumatic Stress*, 24(1), 44-53.
- Galea, S., Nandi, A., Stuber, J., Gold, J., Acerno, R., Best, C. L., et al. (2007). Participant reactions to survey research in the general population after terrorist attacks. *Journal of Traumatic Stress*, 20(4), 467-475.
- Gören, A. B. (2023). Afet sonrası ikincil travmatik stres ve dini başa çıkma: Kahramanmaraş depremi örneği. *Marife Dini Araştırmalar Dergisi*, 23(1), 80-100.
- Hobfoll, S. E., Watson, P., Bell, C. C., Bryant, R. A., Brymer, M. J., Friedman, M. J., et al. (2007). Five essential elements of immediate and mid-term mass trauma intervention: Empirical evidence. *Psychiatry*, 70(4), 283-315.
- Inter-Agency Standing Committee. (2007). *IASC guidelines on mental health and psychosocial support in emergency settings*. IASC.
- Korucu, T. Ş., & Kaya, D. Ö. (2023). Yeniden yaşama sarılmak: Deprem sonucu gelişen travma sonrası stres bozukluğu yönetiminde temel beden farkındalık terapisi. *İzmir Katip Çelebi Üniversitesi Sağlık Bilimleri Fakültesi Dergisi*, 8(2), 755-761.

- Kun, P., Tong, X., Liu, Y., Pei, X., & Luo, H. (2013). What are the determinants of post-traumatic stress disorder: Age, gender, ethnicity or other? Evidence from 2008 Wenchuan earthquake. *Public Health*, 127(7), 644-652.
- Kurt, E., & Gülbahçe, A. (2019). Van depremini yaşayan öğrencilerin travma sonrası stres bozukluğu düzeylerinin incelenmesi. *Atatürk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 23(3), 957-972.
- Lai, T. J., Chang, C. M., Connor, K. M., Lee, L. C., & Davidson, J. R. (2004). Full and partial PTSD among earthquake survivors in rural Taiwan. *Journal of Psychiatric Research*, 38(3), 313-322.
- Math, S. B., Nirmala, M. C., Moirangthem, S., & Kumar, N. C. (2015). Disaster management: Mental health perspective. *Indian Journal of Psychological Medicine*, 37(3), 261-271.
- Neria, Y., Nandi, A., & Galea, S. (2008). Post-traumatic stress disorder following disasters: A systematic review. *Psychological Medicine*, 38(4), 467-480.
- North, C. S., Oliver, J., & Pandya, A. (2013). Examining a comprehensive model of disaster-related posttraumatic stress disorder in systematically studied survivors of 10 disasters. *American Journal of Public Health*, 103(4), e38-e46.
- Patel, V., Chowdhary, N., Rahman, A., & Verdeli, H. (2011). Improving access to psychological treatments: Lessons from developing countries. *Behaviour Research and Therapy*, 49(9), 523-528.
- Rajkumar, A. P., Premkumar, T. S., & Tharyan, P. (2008). Coping with the Asian tsunami: Perspectives from Tamil Nadu, India on the determinants of resilience in the face of adversity. *Social Science & Medicine*, 67(5), 844-853.
- Ruzek, J. I., & Yeager, C. M. (2017). Internet and mobile technologies: Addressing the mental health of trauma survivors in less resourced communities. *Global Mental Health*, 4, e16.
- Tang, B., Liu, X., Liu, Y., Xue, C., & Zhang, L. (2014). A meta-analysis of risk factors for depression in adults and children after natural disasters. *BMC Public Health*, 14(1), 623.
- Wang, X., Gao, L., Shinfuku, N., Zhang, H., Zhao, C., & Shen, Y. (2009). Longitudinal study of earthquake-related PTSD in a randomly selected community sample in north China. *American Journal of Psychiatry*, 166(3), 340-347.
- World Health Organization. (2013). Building back better: Sustainable mental health care after emergencies. WHO.
- Xu, J., & Song, X. (2011). Posttraumatic stress disorder among survivors of the Wenchuan earthquake 1 year after: Prevalence and risk factors. *Comprehensive Psychiatry*, 52(4), 431-437.
- Zang, Y., Hunt, N., & Cox, T. (2013). A randomised controlled pilot study: The effectiveness of narrative exposure therapy with adult survivors of the Sichuan earthquake. *BMC Psychiatry*, 13(1), 41.