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The Psychological Toll on Healthcare Workers Following Türkiye's Earthquake Disasters

Türkiye'deki Deprem Felaketlerinin Sağlık Çalışanları Üzerindeki Psikolojik Etkisi

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ABSTRACT

Objective: The Kahramanmaraş-centered earthquakes in Türkiye profoundly impacted local healthcare workers' mental health. This study examines the relationships between sociodemographic and clinical variables, perceived social support, and psychological resilience in Post-Traumatic Stress Disorder (PTSD) development.

Materials and Methods: A cross-sectional survey was conducted among 104 healthcare workers from ten affected provinces: Adana, Adıyaman, Diyarbakır, Gaziantep, Hatay, Kahramanmaraş, Kilis, Malatya, Osmaniye, and Şanlıurfa. Participants completed the PTSD Checklist for DSM-5 (PCL-5), Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI), Multidimensional Scale of Perceived Social Support (MSPSS), and Connor-Davidson Resilience Scale (CD-RISC).

Results: The results revealed that 17.3% of participants exhibited severe trauma responses, while 82.7% had low trauma responses. Higher PTSD rates were associated with individuals living in moderately to severely damaged homes (%13.5, p=0.009) and assistant doctors whose education was interrupted by the disaster (%5.87, p= 0.019). Furthermore, PTSD diagnosis was positively correlated with anxiety (33±9, p<0.001) and depression scores (28±13, p<0,001) and negatively correlated with resilience (43±13, p<0.001).

Conclusions: These findings emphasize the urgent need for improved working conditions and the implementation of long-term follow-up studies for healthcare workers in earthquake-prone areas, to address the psychological impact of such disasters.

Keywords: Earthquakes, healthcare workers, post-traumatic stress disorder, psychological resilience

ÖZ

Amaç: Türkiye'de Kahramanmaraş merkezli depremler, bölgedeki sağlık çalışanlarının ruh sağlığını derinden etkilemiştir. Bu çalışma, sosyodemografik ve klinik değişkenler, algılanan sosyal destek ve psikolojik dayanıklılık ile Travma Sonrası Stres Bozukluğu (TSSB) gelişimi arasındaki ilişkiyi araştırmayı amaçlamaktadır.

Materyal ve Metot: Adana, Adıyaman, Diyarbakır, Gaziantep, Hatay, Kahramanmaraş, Kilis, Malatya, Osmaniye ve Şanlıurfa illerindeki sağlık çalışanları arasında kesitsel bir anket çalışması yapılmıştır. Katılımcılara, DSM-5 TSSB Kontrol Listesi (PCL-5), Beck Anksiyete Ölçeği (BAI), Beck Depresyon Ölçeği (BDI), Çok Boyutlu Algılanan Sosyal Destek Ölçeği (MSPSS) ve Connor-Davidson Dayanıklılık Ölçeği (CD-RISC) uygulanmıştır.

Bulgular: Sonuçlar, katılımcıların %17,3'ünün yüksek düzeyde travma tepkisi gösterdiğini, %82,7'sinin ise düşük düzeyde travma tepkisi gösterdiğini ortaya koymuştur. Orta veya ciddi hasar görmüş evlerde yaşayan (%13,5, p=0,009) ve eğitimleri deprem nedeniyle kesintiye uğrayan asistan doktorlar (%5,87, p= 0,019) arasında daha yüksek TSSB oranları görülmüştür. Ayrıca, TSSB tanısı, anksiyete (33±9, p<0,001) ve depresyon skorları (28±13, p<0,001) ile pozitif, dayanıklılık ile negatif bir ilişki göstermiştir (43±13, p<0,001).

Sonuç: Bu bulgular, sağlık çalışanlarının ruhsal etkilerle başa çıkabilmesi için çalışma koşullarının iyileştirilmesi ve uzun dönem takip çalışmalarının uygulanması gerekliliğini vurgulamaktadır.

Anahtar Kelimeler: Depremler, sağlık çalışanları, post-travmatik stres bozuklukları, psikolojik dirençlilik

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INTRODUCTION

The major earthquakes centered in Kahramanmaraş on February 6, 2023, devastated multiple cities in Türkiye, affecting around 15 million people, resulting in over 40,000 deaths and 100,000 injuries.[1] Despite facing personal losses and struggling with basic needs, many healthcare workers continued to care for victims, embodying the dual roles of rescuer and victim.[2]

While research on Post-Traumatic Stress Disorder (PTSD) has frequently focused on rescue teams and emergency responders, there has been limited study of local healthcare personnel who were themselves primary victims of the disaster. These healthcare workers are believed to experience higher rates of PTSD and depression than those who arrived later to assist.[3]

Perceived social support is a key factor influencing both the development and continuation of PTSD symptoms. The nature of social interactions plays a vital role in recovery, as strong support networks can help mitigate PTSD symptoms and enhance overall mental well-being.[4,5]

Additionally, resilience, the capacity to adapt positively to trauma, has emerged as a crucial factor in trauma recovery. Studies, including a large-scale investigation in Japan, indicate that resilience can protect against PTSD, especially when reinforced by stable routines and work opportunities.[6] For healthcare workers who face frequent exposure to traumatic events, including disasters and pandemics, fostering resilience is essential to mental health outcomes.[2,7]

This study aims to assess the impact of earthquakes on the mental health of local healthcare workers, examining how perceived social support and psychological resilience influence PTSD risk. The findings may provide insights into the development of evidence-based support strategies to help healthcare professionals cope with trauma.

MATERIALS AND METHODS

Ethical Approval: Ethical approval for the study was obtained from Gazi University on June 20, 2023 (Date: 20.06.2023; decision no: 12). This study was conducted in accordance with international declarations, guidelines, and ethical principles, including the Declaration of Helsinki.

Study Design and Data Description: Healthcare workers in ten provinces affected by the Kahramanmaraş-centered earthquakes on February 6, 2023 (Adana, Adıyaman, Diyarbakır, Gaziantep, Hatay, Kahramanmaraş, Kilis, Malatya, Osmaniye, Şanlıurfa) were invited to participate through survey forms distributed via Google Forms. Participants were informed about the study's purpose and methodology, and consent was obtained. Surveys were conducted from August 7 to September 7, 2023, six months after the earthquake trauma.

Scales and Calculating the Scores:

Sociodemographic Data Form: Prepared by the researchers based on literature review, this form includes questions about participants' age, education, profession, work status during the earthquakes, earthquake-related losses, living situation post-earthquake, and the return-to-work process.

PTSD Checklist for DSM-5 (PCL-5): The PTSD Checklist for DSM-5 (PCL-5) was developed by Weathers et al.[8] to measure symptoms of post-traumatic stress disorder (PTSD) based on the DSM-5 diagnostic criteria. The scale evaluates PTSD symptoms across four core factors: re-experiencing, avoidance, negative alterations in cognition and mood, and hyperarousal. It consists of a total of 20 items, with responses rated on a 5-point Likert scale (0: Not at all, 4: Extremely). Respondents indicate how often they have experienced each symptom over a specific period.

The total score is calculated by summing the ratings of all 20 items, yielding a possible score range of 0 to 80, where higher scores indicate greater severity of PTSD symptoms. The PCL-5 is widely used in both research and clinical settings for diagnosing PTSD and evaluating symptom severity.

The Turkish adaptation of the scale was carried out by Boysan et al.[9], who confirmed its reliability and validity. In the Turkish version, a cutoff score of 48 was determined for distinguishing individuals at risk of PTSD according to DSM-5 criteria. A total score of 48 or higher suggests that the individual may be at risk for PTSD and warrants further clinical evaluation.

Beck Anxiety Inventory (BAI): The inventory, initially developed by Beck et al.[10], assesses the physical, emotional, and cognitive dimensions of anxiety and the fear of losing control. Ulusoy et al.[11] later adapted the scale into Turkish. Comprising 21 items scored on a scale from 0 to 3, the total score ranges from 0 to 63, reflecting the severity of anxiety.

Beck Depression Inventory (BDI): A self-report scale composed of 21 items measuring somatic, emotional, cognitive, and impulsive symptoms of depression.[12] Each item is scored between 0 and 3. The total score spans from 0 to 63, with higher values representing greater severity of depression. The Turkish adaptation was conducted by Hisli.[13]

Multidimensional Scale of Perceived Social Support (MSPSS): Developed by Zimet et al.[14] and validated in Turkish by Eker et al.[15] It is a 12-item scale that subjectively evaluates the adequacy of social support received from three different sources (family, friends, and a significant other). Higher

scores indicate higher perceived social support.

Connor-Davidson Resilience Scale (CD-RISC): Initially developed by Connor and Davidson[16] and later validated in Turkish[17], this scale comprises 25 items rated on a 5-point Likert scale, where higher scores reflect greater psychological resilience. The Turkish adaptation includes subscales focusing on persistence and personal competence, tolerance for negative experiences, and spiritual inclination.

Statistical Analysis: The data were analyzed utilizing IBM SPSS Statistics version 26.0. Normality was checked with the Kolmogorov-Smirnov test, and nonparametric tests were used due to non-normal distribution. The Kruskal-Wallis test analyzed categorical and numerical variables, with post hoc analysis by Mann-Whitney U test. Chi-square and Fisher Exact tests examined categorical relationships, with significance set at $p<0.05$. A power analysis (medium effect size, Cohen's $d=0.5$; $\alpha=0.05$; power=80%) indicated a necessary sample size of 104, ensuring an 80% chance of detecting a medium effect.

RESULTS

Table 1 presents the sociodemographic and earthquake-related characteristics. Of the 104 healthcare workers, 60 (57.7%) were female and 44 (42.3%) were male, with an average age of 36. In total, 34 (32.7%) reported physical injuries, 48 (46.2%) had homes moderately to severely damaged, and 13 (12.5%) lost a first-degree relative. While 56 (53.8%) continued living in their homes, others stayed with relatives, in guesthouses or hotels, in tents or containers, or relocated. Among assistant doctors, 13 (86.7%) reported educational disruptions, 7 (46.7%) considered changing clinics, and 3 (20%) had already done so. Figure 1 shows the distribution of cities where healthcare workers reside.

Table 1. Sociodemographic and earthquake-related characteristics.

Characteristics		n (%)
Gender	Women	60 (57.7)
	Men	44 (42.3)
Physically injured due to the earthquakes	Yes	34 (32.7)
	No	70 (67.3)
Damaged house due to the earthquakes	Yes	48 (46.2)
	No	56 (53.8)
Death of first-degree relatives due to the earthquakes	Yes	13 (12.5)
	No	87 (87.5)
Residing in the same house as before the earthquakes	Yes	56 (53.8)
	No	48 (46.2)
Disruption in the education of assistant doctors	Yes	13 (86.7)
	No	2 (13.3)
Consider changing clinic	Yes	7 (46.7)
	No	5 (33.3)
	I changed	3 (20)

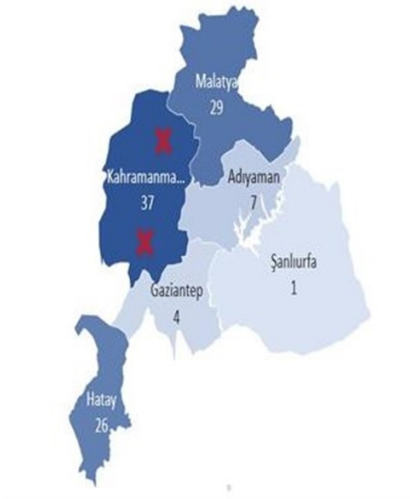

Figure 1: During and after the Kahramanmaraş earthquakes, the provinces where healthcare professionals participating in the study resided, distribution of participants by province (n), and the epicenters of the earthquake (X).

The relationship between sociodemographic variables and PTSD diagnosis is shown in Table 2. Two groups were formed based on PCL-5 total scores: one group with severe trauma response and PTSD diagnosis, and another group with low trauma response. Laboratory technicians had statistically significantly lower rates of PTSD diagnosis compared to other healthcare workers (p=0.027). Healthcare workers whose homes were moderately to severely damaged had higher rates of PTSD diagnosis compared to those with mildly damaged homes (p=0.009). Those who moved in with relatives due to home damage had higher rates of PTSD diagnosis (p=0.027). Assistant doctors experiencing educational disruptions had higher PTSD rates than those without disruptions (p=0.019).

The relationship between clinical characteristics of healthcare workers and PTSD diagnosis is shown in Table 3. Those physically injured due to the earthquake had higher PTSD rates compared to those not injured (p=0.013).

Table 2. Sociodemographic characteristics and their association with PTSD diagnosis.

Characteristics		PTSD		p-value
		No n (%)	Yes n (%)	
Gender	Woman	48 (46)	12	0.345
	Man	38 (36.6)	6 (5.8)	
Marital status	Single	27 (26)	8 (7.7)	0.265
	Married	59 (56.7)	10 (9.6)	
Occupation	Assistant doctor	9 (8.6)	6 (5.8)	0.027*
	Specialist	13 (12.5)	2 (2)	
	Nurse	22 (21.1)	5 (4.8)	
	Clinic staff	14 (13.4)	3 (2.9)	
	Medical secretary	14 (13.4)	2 (2)	
	Pharmacist	2 (2)	0 (0)	
	Laboratory technician	12 (11.5)	0 (0)	
Working during the earthquakes	Yes	26 (25)	7 (6.7)	0.308
	No	60 (57.7)	11 (10.6)	
Damaged house due to the earthquakes	None	3 (2.9)	0 (0)	0.009*
	Yes, light	50 (48)	4 (3.9)	
	Yes, medium	22 (21.1)	12 (11.5)	
	Yes, heavy	11 (10.6)	2 (2)	
Where do you live after earthquakes?	House before the earthquakes	52 (50)	4 (3.9)	0.027*
	With my relatives in their house	10 (9.5)	8 (7.7)	
	Hotel, guesthouse, etc	10 (9.5)	2 (2)	
	Tenth or container	4 (3.9)	2 (2)	
	Migrated to another city	10 (9.5)	2 (2)	
Death of first-degree relatives due to the earthquakes	Yes	8 (7.7)	5 (4.8)	0.026
	No	78 (75)	13 (12.5)	
After the earthquakes, I started to work	On the call of supervisor	41 (39.4)	12 (11.5)	0.057*
	As a volunteer	36 (34.6)	6 (5.8)	
	I did not start working	9 (8.7)	0 (0)	
Workday after the earthquakes	Median range (min-max)	3 (1-100)	5 (1-70)	0.661*
Disruption in the education of assistant doctors	Yes	8 (7.7)	5 (4.9)	0.019
	No	1 (0.97)	1 (0.97)	
Consider changing clinic[a]	Yes	5 (4.9)	2 (2)	0.749*
	No	3 (2.9)	2 (2)	
	I changed	1 (0.97)	2 (2)	

*Mann Whitney-u Test; a 89 participants declared that they were not assistant doctors; The opportunity to change clinics was given only to assistant doctors by the state; PTSD: Post Traumatic Stress Disorder.

Table 3. Clinical characteristics of healthcare workers and their association with PTSD diagnosis.

Characteristics		PTSD		p-value
		No n (%)	Yes n (%)	
Previous psychiatric treatment	Yes	15 (14.4)	4 (3.9)	0.323
	No	71 (68.2)	14 (13.4)	
Previous psychiatric diagnose	None	74 (71.2)	14 (13.4)	0.288*
	Major depressive disorder	10 (9)	0 (0)	
	Generalized anxiety disorder	1 (0.97)	1 (0.97)	
	Panic disorder	1 (0.97)	3 (2.9)	

*Mann Whitney-u Test

Table 3. Continue.

Familial psychiatric treatment	Yes	12 (11.5)	4 (3.9)	0.323
	No	74 (71.2)	14 (13.4)	
Experience a traumatic event before the earthquakes	No	70 (67.3)	11 (10.5)	0.075*
	Yes, earthquake	9 (8.6)	4 (3.9)	
	Yes, violence	4 (3.9)	0 (0)	
	Yes, accident	3 (2.9)	3 (2.9)	
Psychiatric treatment after earthquake	Yes	14 (13.4)	6 (5.8)	116
	No	72 (69.3)	12 (11.5)	
Physically injured due to the earthquakes	Yes	24 (23)	10 (9.6)	0.013
	No	62 (59.7)	8 (7.7)	

*Mann Whitney-u Test

The relationship between PTSD diagnosis and BAI, BDI, MSPSS, CD-RISC total scores, and CD-RISC subscale scores is shown in Table 4. A statistically significant positive correlation was found between PTSD diagnosis and total BAI and BDI scores ($p<0.001$, $p<0.001$). There was an evident negative correlation between PTSD diagnosis and CD-RISC total score and subscales of perseverance and personal competence, and tolerance of negative events ($p<0.001$, $p=0.003$).

Table 4. Scale scores of healthcare workers and their association with PTSD diagnosis.

Scores	PTSD		p-value
	No Mean±SD	Yes Mean±SD	
BAI score[a]	15±7	33±9	0,001
BDI score[b]	15±8	28±13	0,001
MSPSS score[c]	48±14	43±15	0,229
CD-RISC score[d]	58±11	43±13	0,001
Perseverance and personal competence	35±8	24±9	0,001
Tolerance to negative facts	14±4	11±3	0,003
Spiritual inclination	9±3	8±3	0,252
-			

a: Beck Anxiety Inventory; b: Beck Depression Inventory; c: The Multidimensional Scale Of Perceived Social Support; d: The Connor–Davidson Resilience Scale.

DISCUSSION AND CONCLUSION

This study aims to assess the mental health and PTSD risk among healthcare workers in the earthquake zone who directly experienced the trauma, identifying factors that influence this risk. Although studies exist on outside aid teams, detailed research on the mental state of local healthcare workers remains limited.[18]

Our study found a PTSD diagnosis rate of 17.3% among healthcare workers, consistent with previous research showing prevalence rates of 16.37% and 21.9% following earthquakes.[19,20] Differences in PTSD rates across studies may result from the varied cutoff scores used for the PCL-5 scale, ranging from 22 to 49.[21] Using Boysan et al.'s[9] Turkish adaptation, we set a cutoff of 48; if we considered scores above 31 as indicative of PTSD, the rate would be higher.

No significant difference in PTSD diagnosis was observed between genders. Although some studies identify female gender as a risk factor for PTSD [20-22], others find no such effect. These differences might be related to sample size and the number of women in the sample.

Our study found that the profession is a risk factor for PTSD development among healthcare workers, with nurses particularly being more likely to receive a PTSD diagnosis. This may be attributed to the higher proportion of female nurses.[18,23] However, our study found no difference in PTSD diagnosis rates between nurses and other professions. This result might be due to the lack of a gender difference in PTSD diagnosis in our study, with 7 out of 27 nurses being male, potentially influencing the outcome. The only significant professional finding was that laboratory technicians had statistically lower PTSD rates compared to other healthcare workers, possibly due to their behind-the-scenes role in post-trauma interventions.

Of the 15 assistant doctors in our study, 13 (86.7%) reported disruptions in their educational activities post-earthquake, with 3 (20%) changing clinics as a result. Assistant doctors who experienced educational disruptions showed a higher likelihood of being diagnosed with PTSD, underscoring the importance of returning to familiar work and life routines for

psychological recovery. These findings highlight the need for structured support systems that facilitate continuity in educational and professional activities, which, as noted in previous studies, can aid in stabilizing mental health and resilience in the aftermath of trauma [24].

No significant relationship was found between past trauma and PTSD, though earthquake-related trauma was the most common (12.5%), likely due to the study area's seismic activity. Geographic factors thus appear to shape trauma experiences, as repeated exposure to disasters may elevate trauma risks, even if not directly linked to PTSD here.

Other key findings indicate higher PTSD rates among healthcare workers with severely damaged homes, physical injuries, or a first-degree relative loss in the earthquake, aligning with research identifying injury, home loss, and bereavement as PTSD risk factors.[25,26] Those who continued living in their own homes post-earthquake had lower PTSD rates.

Comorbid diagnoses are common in PTSD, with over 50% of patients meeting criteria for another psychiatric disorder.[27] In our study, 38.6% of healthcare workers experienced depression, and 57.7% reported anxiety, with higher scores among those diagnosed with PTSD. Comorbid anxiety and depression in PTSD are linked to chronicity and treatment resistance, highlighting the importance of addressing these symptoms for prognosis. [28] Despite experiencing mental health symptoms, only 20.8% of healthcare workers sought psychiatric support post-earthquake. The Turkish Psychiatric Association offered guidance and remote services with volunteer experts, underscoring the need for targeted mental health teams for healthcare workers post-disaster.[29]

Perceived social support is a known risk factor for PTSD.[4,5] Although healthcare workers with PTSD had slightly lower MSPSS scores, the difference was not statistically significant. Due to widespread disruptions, including mobile and transportation issues, social support was likely limited following the earthquakes.

Psychological resilience is critical for recovery.[30] In our study, healthcare workers with PTSD had lower resilience scores, particularly in perseverance and tolerance for negative events, mirroring findings from other earthquake-affected populations. These results emphasize the value of resilience-building interventions post-disaster.

Our study provides a unique look at the mental health, PTSD prevalence, and resilience of healthcare workers impacted by an earthquake. However, there are several limitations to consider. These include the small sample size, the cross-sectional design, and the reliance on self-reported scales without clinical interviews. Additionally, the absence of a control group and the unequal distribution of occupational groups limit the generalizability of the findings. Future research should incorporate clinical evaluations alongside self-report measures and strive for more representative sampling to address these issues.

In conclusion, our findings reveal a high prevalence of early-onset psychiatric disorders among healthcare workers affected by earthquakes. Resident doctors who experienced training disruptions, home damage, injuries, or the loss of close relatives exhibited higher rates of PTSD. PTSD often coexisted with depression and anxiety, though many individuals avoided seeking psychiatric help. Psychological resilience emerged as a significant protective factor. The mental health of healthcare workers is crucial, emphasizing the need for improved post-disaster working conditions and support that addresses psychological, social, and medical needs. Long-term studies in Türkiye are essential to ensure sustained mental health support in this earthquake-prone region.

Ethics Committee Approval: Ethical approval for the study was obtained from Gazi University on June 20, 2023 (Date: 20.06.2023; decision no: 12). All participants provided informed consent.

Conflict of Interest: No conflict of interest was declared by the authors.

Author Contributions: Concept – MG, ÖŞO; Supervision – MG, ÖŞO; Materials – MG, ÖŞO; Data Collection and/or Processing – MG, ÖŞO; Analysis and/or Interpretation – MG, ÖŞO; Writing – MG, ÖŞO.

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