Turk J Public Health
Available online at: http://dergipark.org.tr/tjph/
Doi: 10.20518/tjph.1546356

ORIGINAL ARTICLE

Post-traumatic stress and secondary traumatic stress of earthquake-affected and non-affected healthcare workers after the 6th February Earthquake in Türkiye

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Received: 14.09.2024, **Accepted:** 30.03.2025

Abstract

Objective: This study aims to investigate the presence of post-traumatic stress disorder and secondary traumatic stress in earthquake-affected healthcare workers (HCW) and non-affected deployed health workers.

Method: Healthcare professionals deployed to earthquake-affected areas from the provinces not affected by the earthquake were determined as the first group and healthcare personnel who have experienced the earthquake themselves were determined as the second group. Data was collected via a form to investigate sociodemographic information, occupational exposure, post-earthquake experience, Post-Traumatic Stress Disorder Symptom Self-Report Scale (PSS-SR), and Secondary Traumatic Stress Scale (STSS). Mann-Withney U test, Kruskal Wallis test, and chi-square test were used to evaluate the analytical relationship.

Results: The median PSS-SR score of healthcare workers who were non experienced of the earthquake (14.0 (5.0-29.0)) was found to be lower than the median PSS-SR score (27.0 (16.0-34.0)) of healthcare workers who were affected by the earthquake ($p<0.001$). The median STSS score of healthcare workers who had non experienced the earthquake (30.0 (22.0-48.0)) was found to be lower than the median STSS score of the earthquake-affected healthcare workers (50.0 (38.0-58.0)) ($p<0.001$). The sleep patterns and nutrition patterns of the earthquake-affected healthcare personnel were more negatively affected than the non-affected healthcare personnel ($p<0.001$).

Conclusion: The PSS-SR and STSS scores were higher and sleep patterns and nutrition were affected more after the earthquake than those who were non-earthquake victims. For this reason, in health workforce planning, it would be appropriate to continue services by deployed healthcare workers instead of disaster-affected healthcare workers and to provide psychological support to earthquake-affected healthcare workers.

Keywords: Stress Disorders, Post-Traumatic, Mental Health, Disasters, Earthquakes

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Cite This Article: Taş A, Akpınar G, Yükseler A, Oruç M, Celbiş O. Post-traumatic stress and secondary traumatic stress of earthquake-affected and non-affected healthcare workers after the 6th February Earthquake in Türkiye. Turk J Public Health 2025;23(1): 80-93.

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Turkish Journal of Public Health *published by Cetus Publishing.*

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INTRODUCTION

After earthquakes, the majority of survivors bear witness to the loss of relatives and friends, physical injuries, and the destruction of their homes and workplaces. This situation leads to both severe economic losses for the surviving individuals and the persistence of traumatic memories, resulting in psychological problems[1]. Particularly, healthcare professionals residing in earthquake-prone regions, due to the nature of their professions, experience heavier emotional and psychological processes, being exposed to more traumatic memories compared to other individuals.

One commonly observed psychiatric disorder following natural disasters is post-traumatic stress disorder (PTSD)[2]. PTSD is a psychiatric disorder characterized by symptoms such as re-experiencing the traumatic event, avoidance of stimuli reminiscent of the traumatic event, slowed reactions, decreased interest, increased arousal, and disruptions in sleep and eating patterns, occurring after a negative life event[3]. The prevalence of PTSD after earthquakes varies between 6.6% and 64% in different studies, depending on the frequency, severity, and diagnostic criteria of the traumatic events[4,5]. In a study conducted with emergency responders involved in disaster response in Türkiye, the prevalence of PTSD was found to be 2.1%[6].

Stress symptoms following trauma can also manifest in individuals who did not directly experience the trauma but witnessed, heard about, or worked with trauma victims. These stress symptoms, occurring indirectly and not stemming from direct exposure to trauma, are defined as secondary traumatic stress (STS)[7]. In a study involving professions working with trauma victims, 68.7% of participants exhibited moderate levels, and 18% showed severe symptoms of traumatic stress[8].

Among professionals dealing with earthquake victims, both their own victimization and their medical with the injured contribute to the emergence of post-traumatic stress disorder and secondary traumatic stress symptoms. Additionally, those assigned to earthquake-prone areas from outside the region are expected to experience symptoms of secondary traumatic stress.

On February 6, 2022, two major earthquakes with a magnitude of 7 or higher occurred in the Pazarcık and Elbistan districts of Kahramanmaraş in Türkiye. The earthquakes most significantly affected 11 provinces, resulting in the loss of more than 50,000 lives and over 122,000 injuries[9,10]. During this period, both local medical staff directly affected by the earthquake and reinforcements from outside the region were assigned to the earthquake-stricken area.

The aim of this research is to investigate the symptoms of PTSD and STS in eartquake-experienced healthcare professionals actively working in hospitals and tent cities in the earthquake-stricken region, as well as those assigned to the earthquake-stricken area from outside.

METHOD

The data for this descriptive cross-sectional study were collected online in August 2023, which marked the six month after the earthquake. To avoid confusion between Acute Stress Disorder and PTSD, symptoms must persist for at least one month. It has been noted that late-onset PTSD can be diagnosed by the sixth month[3]. During the first month, the

response to trauma is unstable[11], and in some individuals, symptoms may naturally decline within three to six months. A substantial proportion of patients exhibit spontaneous remission within six months[12-14], whereas the risk of chronicity increases beyond this period. Therefore, to capture the long-term effects of the earthquake, data collection began after the sixth month, which marks the first step in demonstrating the long-term impact. In the study, data were gathered through a research-designed questionnaire investigating sociodemographic information, professional exposure, and post-earthquake experiences, along with the Self-Report Post-Traumatic Stress Disorder Scale (PSS-SR) and the Secondary Traumatic Stress Scale (STSS) forms.

The required sample size for the study, considering 80% power, a type 1 error of 0.05, and a medium effect size in a t-test using Gpower, was determined to be 102 individuals. With reserves, a total of 133 individuals were included in the study. The study comprised two groups: healthcare professionals temporarily assigned from outside the earthquake-stricken area (Group 1) (n=62) and earthquake-affected healthcare professionals (Group 2) who had provided services to traumatic patients (n=71).

Since the researchers did not have a list of workers or contact details for those working in the region, healthcare workers in the affected areas (Malatya, Kahramanmaraş, Hatay, Adıyaman, Gaziantep) were reached through solidarity-based social media groups (WhatsApp, Telegram). They were asked to forward the link to the online survey form to healthcare workers in their institutions or those temporarily assigned to the region. In order to reach the temporarily assigned workers, they were asked to complete the form through the social media groups created for the volunteers assigned to the region and to forward the form to other individuals who had been deployed with them. The study included healthcare professionals working in first, second, and third-level health institutions, as well as health directorates, who were involved in the establishment of temporary settlements and the provision of healthcare services. Healthcare workers who were not in the region during the earthquake, those working in administrative roles only in desk jobs, and individuals who were on administrative leave after the earthquake and did not participate in the relief efforts were excluded from the study.

The data were collected anonymously online through a platform called Google Forms. Before starting the survey, participants were presented with an informational form outlining the research's purpose, the information about researchers responsible for conducting the study, and the criteria for who should complete the survey. The form also included a statement indicating that participation was voluntary. After consenting to participate, individuals were asked to complete a series of multiple-choice, open-ended, and Likert-type questions on the online form, which took approximately 10 minutes. To prevent data loss, it was mandatory for all questions to be answered in order to submit the survey. No personal contact details, such as names or phone numbers, were collected. To avoid duplicate responses, participants were required to log in using their email addresses on Google Forms; however, the researchers were restricted from viewing the participants' email addresses. The first section of the online

data collection form included questions designed by the researchers to gather sociodemographic information, professional experience, disaster-related work experience, the location of post-earthquake duties, details about life and property losses, emotions evoked by working in the disaster area, and challenges in accessing basic needs. The second section contained the PSS-SR form for assessing PTSD, while the third section included the STSS form to assess secondary traumatic stress (STS).

PSS-SR was developed by Foa et al. (1993), it validation and realibility in Turkish was made by Aydın et al. (2012) The Likert-type scale comprises 17 questions, and scores range from 0 to 51, with higher scores indicating increased levels of post-traumatic stress[15,16]. Secondary Traumatic Stress Scale (STSS), developed by Bride et al., was validated and made reliable in Turkish by Yıldırım et al. The Likert-type scale consists of 17 questions, and scores range from 17 to 85, with higher scores indicating increased levels of secondary traumatic stress[17,18].

Data obtained from the study were analyzed using the Statistical Package for Social Sciences (SPSS) 19.0 (IBM Corp.). The Kolmogorov-Smirnov test was conducted to assess normal distribution suitability. Descriptive statistics, including numbers and percentages, as well as medians and quartiles (Q1-Q3), were presented together. To evaluate the relationship between scale scores of two independent variables, the Mann-Whitney U test was employed, and for assessing the relationship between scale scores of more than two independent variables, the Kruskal-Wallis test was utilized. The chi-square test was applied to evaluate the relationship between categorical variables.

RESULTS

Participants' median age was 33.0 (29.0-40.5) and 54.9% were female. The median of professional experience was 10.0 (5.0-16.0) years. The median age of healthcare professionals affected by the earthquake is significantly lower than those assigned through deployment (p=0.014). The rate of participants who worked in hospital among earthquake-affected healthcare professionals participating in the study is significantly higher compared to those assigned through deployment (p<0.001). The sociodemographic characteristics of the participants are provided in Table 1.

Of the participants, 27.1% experienced the loss of relatives or acquaintances in the earthquake. Additionally, 17.3% of the participants reported moderate to severe damage in their homes. Among earthquake-affected healthcare professionals (n=71), 52.1% reside in their own homes, 29.6% in the homes of relatives, and 18.3% in communal living spaces after the earthquake. Among healthcare professionals deployed to the area (n=62), 48.4% stayed in dormitories, 25.8% in tents, 12.9% in hospitals, and 12.9% in containers following the earthquake. Of those deployed, 83.9% stayed in these accommodations with their teams from their home cities, 12.9% with earthquake-affected healthcare professionals, and 3.2% stayed alone. Moreover, 93.5% of healthcare professionals deployed to the area came to work voluntarily in the earthquake-stricken region.

Table 1. Sociodemographic and Occupational Characteristics of Participants

		Total (n=133)		Group 1 (n=62)		Group 2 (n=71)		
		Median (Q1-Q3)		Median (Q1-Q3)		Median (Q1-Q3)		p
Age		33.0 (29.0-40.5)		32.0 (29.0-36.0)		35.0 (30.0-42.0)		0.014
Professional experience (Years)		10.0 (5.0-16.0)		9.0 (5.0-14.0)		11.0 (5.0-18.0)		0.293
		n	%	n	%	n	%	
Gender	**Female**	73	54.9	32	54.6	41	57.7	0.478
	Male	60	45.1	30	48.4	30	42.3	
Kids	**Have**	56	42.1	18	29.0	38	53.5	0.004
	Not have	77	57.9	44	71.0	33	46.5	
Martial Status	**Married**	82	61.7	34	54.8	48	67.6	0.183
	Single/Divorced	51	38.3	28	45.2	23	32.4	
Profession	**Medical Doctor**	43	32.3	18	29.0	25	35.2	0.343
	Nurse/Midwife	51	38.3	22	35.5	29	40.8	
	Other	39	29.3	22	35.5	17	23.7	
Duty Station	**Hospital**	60	45.1	18	29.0	42	59.2	<0.001
	Temporary Sites	73	54.9	44	71.0	29	40.8	
Experienced in working post-earthquake	**Yes**	47	35.3	24	38.7	23	32.4	0.563

Changes in sleep, nutrition, and personal hygiene status of healthcare professionals affected by the earthquake and those deployed to the area are presented in Table 2. Earthquake-affected healthcare professionals experience insomnia more frequently compared to their deployed counterparts (p<0.001). Moreover, earthquake-affected healthcare professionals exhibit unhealthier eating habits after the earthquake in comparison to those deployed (p<0.001). There is no significant difference in the changes in the sexual lives of both groups (p=0.191). Earthquake-affected healthcare professionals face more challenges in bathing compared to those deployed (p<0.006). Additionally, earthquake-affected healthcare professionals encounter more difficulties in accessing clean water (p<0.001) and personal hygiene materials (p<0.001) compared to their deployed counterparts.

The most common feelings experienced by healthcare personnel while working after the earthquake are the feeling of usefulness (57.1%), the feeling of despair (39.8%) and the feeling of togetherness (37.6%), respectively. Positive emotions are seen more frequently in assigned healthcare workers (90.3%) than in the earthquake victim group (56.3%) (p<0.001). Negative emotions are seen more frequently in earthquake-affected healthcare professionals (74.6%) than in the assigned group (45.2%) (p=0.001). Feeling nothing, feeling of being useful, and feeling of togetherness are significantly more common in the assigned group than in the earthquake victim group (p=0.045, p=0.003, p=0.003, respectively). Feelings of despair, worthlessness, and injustice are more common in the earthquake victim group than in the assigned group (p=0.004, p=0.002, p<0.001, respectively). (Table 3).

Table 2. Changes in Basic Needs After Earthquake Experience

		Total (n=133)		Group 1 (n=62)		Group 2 (n=71)		
		n	%	n	%	n	%	P
Sleep	Same	48	36.1	34	54.8	14	19.7	<0.001
	Difficulty falling asleep	63	47.4	28	45.2	35	49.3	
	Can't sleep	22	16.5	0	0.0	22	31.0	
Nutrition	Same	62	46.6	44	71.0	18	25.4	<0.001
	More healtier	4	3.0	4	6.5	0	0.0	
	Less healtier	67	50.4	14	22.6	53	74.6	
Sexual Needs	Same	88	66.2	46	74.2	42	59.2	0.191
	Negatively affected	40	30.1	14	22.6	26	36.6	
	Positively affected	5	3.8	2	3.2	3	4.2	
Having trouble taking a bath		105	78.9	42	67.7	63	88.7	0.006
Experiencing toilet problems		63	47.4	28	45.2	35	49.3	0.634
Experiencing clean water problems		77	57.9	12	19.4	65	91.5	<0.001
Having a shortage of hygiene kit		77	57.9	30	48.4	47	66.2	0.038

Group 1: Earthquake non-experienced healthcare workers, Group 2: Earthquake experienced healthcare workers

Table 3. How Participants Felt After Taking Part in the Post-Earthquake Healthcare Works

	Total (n=133)		Group 1 (n=62)		Group 2 (n=71)		
	n	%	n	%	n	%	P
Positive Feelings	96	72.2	56	90.3	40	56.3	<0.001
Feeling nothing	4	3.0	4	6.5	0	0.0	0.045
Heroic feelings	7	5.3	4	6.5	3	4.2	0.705
Being useful	76	57.1	44	71.0	32	45.1	0.003
Togetherness	50	37.6	32	51.6	18	25.4	0.003
Negative Feelings	81	60.9	28	45.2	53	74.6	0.001
Anger	26	19.5	8	12.9	18	25.4	0.113
Helplessness	20	15.0	8	12.9	12	16.9	0.689
Despair	53	39.8	16	25.8	37	52.1	0.004
Worthlessness	19	14.3	2	3.2	17	23.9	0.002
Injustice	28	21.1	4	6.5	24	33.8	<0.001
Pity	21	15.8	6	9.7	15	21.1	0.117
Insufficiency	15	11.3	8	12.9	7	9.9	0.780

Group 1: Earthquake non-experienced healthcare workers, Group 2: Earthquake experienced healthcare workers

The median PSS-SR score for all participants was 23.0 (10.0-32.5). The earthquake-affected group had a higher PSS-SR median score (27.0 (16.0-34.0)) compared to the deployment group (14.0 (5.0-29.0)) (p<0.001). Among professional groups, the nurse/midwife group had a higher PSS-SR median score (28.0 (17.0-34.0)) compared to medical doctors (16.0 (6.0-30.0)) (p=0.041). The median STSS score for all participants was 45.0 (27.0-54.0). There was a significant difference in the STSS median scores between individuals working in hospitals (intensive care, emergency department, ward, operating room) (49.0 (35.0-54.0)) and those working in management and delivery of healthcare services in tent-cities facilities (37.0 (23.0-50.0)) (p=0.002). After pairwise comparisons,

itwasdeterminedonlythatindividualsworking in the emergency department of the hospital had higher STSS median scores compared to those working in tent facilities. Although there seemed to be statistical significance in the multiple comparisons among professional groups, post-Bonferroni correction revealed no significant difference in STSS median scores among professional groups. While no relationship was found between the presence of any loss of life in their surroundings ("yes/no") and STSS and PSS-SR scores. But individuals with loss of life among their relatives had higher STSS and PSS-SR scores compared to those who lost acquaintances or had no loss at all. There was no relationship found between marital status and STSS and PSS-SR scores (p>0.050). Similarly, there was no relationship between having children and STSS and PSS-SR scores (p>0.050) (Table 4). A strong positive correlation was observed between STSS and PSS-SR scores (r=0.878, p<0.001). A low positive correlation was found between age and PSS-SR score (r=0.296, p=0.001), and a weak positive correlation was found between age and STSS score (r=0.207, p=0.017). Professional experience showed a weak positive correlation with STSS and PSS-SR scores (r=0.289, p=0.001, and r=0.196, p=0.024, respectively).

Table 4. PSS-SR and STSS Score Assosiated Factors

		PSS-SR		STSS	
		Median (Q1-Q3)	**P**	**Median (Q1-Q3)**	**P**
Group	Deployed (1)	14.0 (5.0-29.0)	<0.001	30.0 (22.0-48.0)	<0.001
	Earthquake victim (2)	27.0 (16.0-34.0)		50.0 (38.0-58.0)	
Duty Station	Hospital	24.5 (15.0-33.0)	0.098	49.0 (35.0-54.0)	0.002
	Temporary Sites	23.0 (8.0-30.0)		37.0 (23.0-50.0)	
Experienced in working post-earthquake	Yes	24.0 (11.0-34.0)	0.665	46.0 (27.0-54.0)	0.604
	No	22.5 (10.0-31.5)		43.5 (26.0-53.0)	
Profession	Medical Doctor	16.0 (6.0-30.0)	0.041	41.0 (24.0-53.0)	0.209
	Nurse/Midwife	28.0 (17.0-34.0)		46.0 (31.0-57.0)	
	Other	17.0 (11.0-34.0)		44.0 (25.0-51.0)	
Gender	Female	27.0 (14.5-33.5)	0.004	46.0 (31.5-54.0)	0.006
	Male	17.0 (5.0-29.8)		37.5 (22.0-49.0)	
Martial Status	Married	23.0 (10.0-31.3)	0.976	45.0 (24.8-54.0)	0.501
	Single/Divorced	23.0 (11.0-33.0)		44.0 (27.0-61.0)	
Kids	Have	27.0 (13.3-34.0)	0.070	46.0 (29.0-58.8)	0.131
	Not have	20.0 (10.0-30.0)		41.0 (25.5-52.0)	
Loss of Life From Surrondings	Yes	24.0 (12.5-34.8)	0.198	48.0 (30.3-57.8)	0.107
	No	22.0 (10.0-30.0)		44.0 (24.0-53.5)	

PSS-SR: Post-Traumatic Stress Disorder Symptom Self-Report Scale, STSS: Secondary Traumatic Stress Scale, SD: Standart Deviation

Individuals who experienced negative emotions while working after the earthquake had significantly higher scores in both PSS-SR and STSS compared to those who did not experience negative emotions (p<0.001). The median PSS-SR and STSS scores were significantly lower for individuals who did not feel any impact from their work after the earthquake compared to those who felt something (p=0.001 and p=0.003, respectively). Participants who felt useful had lower PSS-SR scores (15.0 (8.0-25.8))

compared to those who did not feel useful (30.0 (18.5-37.0)) (p<0.001). Similarly, those who felt useful had lower STSS scores (31.5 (23.3-48.0)) compared to those who did not feel useful (51.0 (41.0-62.0)) (p<0.001). Individuals who felt despair had higher PSS-SR scores (30.0 (21.5-36.0)) compared to those who did not feel despair (15.0 (8.0-27.8)) (p<0.001). Likewise, those who felt despair had higher STSS scores (52.0 (45.0-61.5)) compared to those who did not feel despair (32.5 (23.0-48.0)) (p<0.001). Participants who perceived injustice had higher PSS-SR scores (30.0 (22.3-35.5)) compared to those who did not perceive injustice (20.0 (9.0-30.5)) (p=0.007). Similarly, those who perceived injustice had higher STSS scores (50.5 (40.3-62.0)) compared to those who did not perceive injustice (41.0 (24.0-52.5)) (p=0.003). While the presence of a sense of pity did not affect STSS scores, individuals who felt a sense of pity had higher PSS-SR scores (30.0 (21.0-36.0)) compared to those who did not feel a sense of pity (21.5 (10.0-30.8)) (p=0.021). Similarly, the presence of a sense of togetherness did not affect STSS scores, but individuals who felt a sense of togetherness had lower PSS-SR scores (15.0 (8.0-27.3)) compared to those who did not feel a sense of togetherness (27.0 (14.0-34.0)) (p=0.013). Participants who felt a sens of insufficent had higher PSS-SR scores (30.0 (17.0-36.0)) compared to those who did not feel a sense of insufficiency (22.0 (10.0-31.0)) (p=0.009). Similarly, those who felt a sense of insufficiency had higher STSS scores (50.0 (45.0-62.0)) compared to those who did not feel a sense of insufficieny (42.0 (24.8-53.3)) (p=0.027). (Table 5)

Table 5. The Relationship Between Feelings of Working After the Earthquake and PSS-SR and STSS Score

		PSS-SR		STSS	
		Median (Q1-Q3)	**p**	**Median (Q1-Q3)**	**P**
Positive Feelings	Yes	17.0 (8.0-28.8)	<0.001	36.0 (24.0-50.0)	<0.001
	No	30.0 (25.0-37.5)		53.0 (45.0-62.0)	
Feeling nothing	Yes	2.0 (1.0-3.0)	0.001	19.5 (17.0-22.0)	0.003
	No	24.0 (11.0-33.0)		45.0 (28.0-54.0)	
Heroic feelings	Yes	25.0 (10.0-28.0)	0.732	46.0 (23.0-48.0)	0.916
	No	23.0 (10.0-33.0)		44.0 (27.0-54.0)	
Being useful	Yes	15.0 (8.0-25.8)	<0.001	31.5 (23.3-48.0)	<0.001
	No	30.0 (18.5-37.0)		51.0 (41.0-62.0)	
Togetherness	Yes	15.0 (8.0-27.3)	0.013	34.0 (26.0-50.5)	0.098
	No	27.0 (14.0-34.0)		48.0 (29.0-54.0)	
Negative Feelings	Yes	28.0 (17.0-34.0)	<0.001	48.0 (37.5-58.0)	<0.001
	No	11.5 (5.0-25.5)		30.5 (22.0-47.0)	
Anger	Yes	24.5 (14.0-32.3)	0.219	46.0 (29.0-53.3)	0.480
	No	22.0 (8.0-33.0)		44.0 (24.0-54.0)	
Helplessness	Yes	24.5 (16.3-33.5)	0.248	49.0 (39.5-61.0)	0.063
	No	22.0 (10.0-32.0)		44.0 (26.0-53.0)	
Despair	Yes	30.0 (21.5-36.0)	<0.001	52.0 (45.0-61.5)	<0.001
	No	15.0 (8.0-27.8)		32.5 (23.0-48.0)	

Table 5.(continue) The relationship between feelings of working after the earthquake and PSS-SR and STSS score					
Worthlessness	Yes	29.0 (23.0-34.0)	0.123	46.0 (41.0-54.0)	0.247
	No	21.5 (10.0-31.5)		43.5 (26.0-54.0)	
Injustice	Yes	30.0 (22.3-35.5)	0.007	50.5 (40.3-62.0)	0.003
	No	20.0 (9.0-30.5)		41.0 (24.0-52.5)	
Pity	Yes	30.0 (21.0-36.0)	0.021	50.0 (37.0-61.0)	0.106
	No	21.5 (10.0-30.8)		44.0 (25.3-53.0)	
Insufficiency	Yes	30.0 (17.0-36.0)	0.009	50.0 (45.0-62.0)	0.027
	No	22.0 (10.0-31.0)		42.0 (24.8-53.3)	

PSS-SR: Post-Traumatic Stress Disorder Symptom Self-Report Scale, STSS: Secondary Traumatic Stress Scale

DISCUSSION

This study has shown that both earthquake experienced and non-experienced healthcare professionals who were involved in post-earthquake duties were negatively affected by both the traumatic events they experienced and the traumas of the patients they treated. In this study, although there was no cut-off value on the scale used, considering the studies in the literature, when suggested cut-off score is selected, it is thought that PTSD is present in 76.1% of healthcare professionals affected by the earthquake. A meta-analysis revealed that PTSD was observed in 16.4% of healthcare professionals after earthquakes[19]. In a study conducted after the Elazığ Province, Türkiye earthquake, severe trauma was found in 25.8% of healthcare professionals in the early period[20]. In a study of healthcare professionals in China after an earthquake, the prevalence of PTSD was found to be 19%[21]. The overall prevalence of PTSD among healthcare worker was 21.9% in Nepal two months after the earthquake[22]. A study conducted in China one year later an earthquake was found %17.0 prevalence of PTSD among medical rescue workers[23]. In Taiwan, 12.7% of emergency medical technicians who responded to the earthquake met the criteria for partial PTSD[24]. In Pakistan, a study conducted 24 months after the earthquake found that the prevalence of PTSD was 42.6% among individuals, the majority of whom had experienced the earthquake and were actively working as disaster rehabilitation and reconstruction workers in the affected region[25]. A study conducted among earthquake survivors in Nepal found that the prevalence of PTSD was 24% ten months after the earthquake[26]. A study on Italian earthquake survivors report a 21.7% prevalence of PTSD[27]. The prevalence of PTSD among survivors of the 2017 Jiuzhaigou earthquake was found to be 52.7%[28]. A meta-analysis of 46 studies found that the incidence of PTSD among earthquake survivors was 23.7%, with a combined incidence of 28.8% for those diagnosed within 9 months and 19.5% for those diagnosed after 9 months[29]. In this study conducted on healthcare workers following the Kahramanmaraş earthquakes, the prevalence of PTSD was found to be higher compared to both healthcare workers in Türkiye and other countries, as well as the PTSD prevalence in studies conducted on the general population of survivors. The higher rate of PTSD in this study may be explained by the occurrence of two consecutive earthquakes with high magnitude, the continued occurrence of aftershocks with a magnitude of 5 or higher during the data collection period, and the ongoing destruction of buildings and presence of heavily damaged

buildings within the cities. Furthermore, the widespread and extensive destruction caused across multiple cities may have contributed to a higher prevalence of PTSD, compared to earthquakes that resulted in smaller-scale damage in more localized areas. Variations in PTSD prevalence observed in the literature following earthquakes may be influenced by factors such as the material and emotional losses experienced by individuals, their resilience and social support, the sociodemographic characteristics of the study populations, and the time elapsed between the earthquake and the study. The higher prevalence of PTSD among healthcare workers compared to the general population may also be influenced by their involvement with traumatic patients, both physically and mentally.

PSS-SR and STSS scores were higher in healthcare professionals exposed earthquake compared to those who came on duty. During a traumatic event such as war in Sudan, the levels of STS and burnout in first responders providing first aid were found to higher than those coming for international aid[30]. In the Kosovo War, the prevalence of PTSD in first aid staff from Kosovo was higher than those deployed by international organizations[31]. In a study of soldiers deployed from the surrounding areas to the earthquake zone in China, it was found that the secondary trauma and burnout levels of these soldiers who were not victims of the earthquake were low, and their satisfaction feelings were high[32]. Similarly, in this study, positive feelings such as a sense of usefulness and a sense of togetherness were more common in those who came on duty from non-affected area, while negative feelings such as despair, injustice, and worthlessness were more common in the group affected by the earthquake. It is expected that positive feelings will be more common in the group where about 90% volunteered, leading to professional and spiritual satisfaction. For earthquake-affected healthcare professionals, continuing to work by leaving behind their losses, families, and routines may explain the presence of negative feelings such as despair and worthlessness.

In women, PSS-SR and STSS scores are higher. Studies conducted after earthquakes in Türkiye, China, Australia, and other countries have also shown that women are more affected by trauma than men[20,21,33]. Similarly, a study conducted after an earthquake in Japan and a meta-analysis examining predictors of STS revealed that women are more prone to secondary trauma than men[34,35]. Although this study showed that marital status and having children did not affect PSS-SR and STSS scores, it has been shown in the literature that having children and being married affect the presence of PTSD[21]. In this study, although the status of having children was asked, there may have been no relationship between having children and scale scores because the ages of the children and whether the children experienced the earthquake were not asked in detail. While previous experience working after an earthquake does not affect the level of STS in this study, working experience as a health working was weakly corraleted STSS scores. Literature has been shown that as experience increases in healthcare professionals serving after a terrorist attack or earthquake, the level of STS decreases[36,37].

Personal basic needs of the participants, it is seen that sleep patterns worsen in earthquake-affected individuals, and access to clean water and toilets becomes more difficult. The

reason for healthcare professionals affected by the earthquake living in worse conditions is thought to be that, in the early period, organization could not be fully achieved within the province, people coming from outside were prepared in advance, and planning for them was made, so the likelihood of experiencing problems in personal needs was estimated to be lower. Therefore, it is essential for every institution to plan for the basic needs of its personnel before a disaster. When looking at both groups, the only personal basic need that is not affected is sexual activity. While an increase in sexual activity is expected with the survival instinct in disaster situations, the working group's pre-earthquake higher living standards, the intensity of work, and the fact that they survived may cause this instinct to be deactivated or individuals to avoid giving the right answer to the question culturally.

Ensuring the sustainability of healthcare services necessitates addressing the basic needs and health requirements of healthcare personnel. This study demonstrates that a significant number of healthcare workers affected by the earthquake suffer from PTSD and STS and are unable to adequately meet their basic needs during the first six months following the disaster. While focusing on the continuity of healthcare service delivery, this study emphasizes the importance of addressing the basic needs and mental health of healthcare personnel, ensuring that their well-being is not overlooked in the provision of healthcare services. Therefore, disaster preparedness should focus on minimizing the anticipated impact and implementing supportive mechanisms in the aftermath. To achieve this, emergency response systems that include mental health support should be established before disasters occur. Personnel working in high-risk earthquake zones should receive training to enhance their resilience to disaster-related stressors, and volunteers willing to serve during disasters should be identified in advance and included in stress management and resilience training programs. Following a disaster, all healthcare personnel who have worked in the affected region should receive routine psychological counseling and be screened for PTSD and STS. Those diagnosed with these conditions should be provided with appropriate mental health interventions. To prevent burnout among healthcare professionals working in disaster zones, temporary or permanent reassignments should be considered. Additionally, workload-related stress should be mitigated through rotational work schedules in high-stress units. In addition to psychological support, ensuring healthcare workers' access to essential resources such as adequate shelter, clean water, food, and rest facilities should be a priority. Disruptions in basic needs can exacerbate stress, negatively impacting both mental well-being and professional performance. Therefore, institutional disaster response plans should include pre-established provisions for securing safe accommodations, sufficient supplies, and proper living conditions for healthcare personnel in disaster-affected regions.

This study has several limitations. Although the data were collected six months after the earthquake, aftershocks and building destructions are still ongoing in the region. Therefore, it should be considered that scale scores may be high due to the continued traumatic stimulus. Although the scale scores

of those who came on duty are lower than those affected by the earthquake, they are higher than the healthy community average. It should be kept in mind that the reason for this may not only be the experienced secondary traumatic event, but also experience of aftershocks while they were working in the region. Considering these limitations, it is thought that repeating the study one year later would be more reliable. In this study, PTSD and STS assessments were conducted using self-report scales without clinical interviews. This may have led healthcare professionals working under earthquake conditions to report their symptoms more severely due to the distress caused by their working environment. Alternatively, some participants might have underreported their symptoms due to concerns about being identified as having a mental health condition. Therefore, the reported prevalence rates of PTSD and STS should not be considered as clinical diagnoses, and the presence of self-reporting bias should be taken into account when interpreting the results. Additionally, since researchers did not have access to contact lists of both local healthcare personnel and those assigned to the region, participants were recruited using the snowball sampling method. As a result, the findings cannot be generalized to all healthcare workers in the earthquake-affected area. Furthermore, individuals who responded to the survey may have been those particularly interested in the topic, more severely affected by the earthquake, or wishing to make their experiences visible. This introduces the possibility of volunteer bias, which should be considered when evaluating the results, as it may have led to a higher reported prevalence of PTSD compared to other studies.

CONCLUSION

Earthquakes constitute traumatic events, and the active engagement of healthcare professionals who are victims of earthquakes exacerbates the traumatic stresses related to the earthquake itself and the secondary traumatic stress symptoms arising from the traumatic experiences of the patients they attend to. This study has demonstrated that both PSS-SR scores and STSS scores are significantly elevated in healthcare professionals affected by the earthquake compared to those who were deployed for duty. Therefore, the imperative of providing support to healthcare professionals affected by the earthquake should not be overlooked. If feasible, after support is provided through deployment, healthcare professionals impacted by the earthquake should be excluded from operational procedures.

ACKNOWLEDGEMENT

Conflict of Interest: The authors declare no interest that may pose conflict with any party.

Financial Support: No funding was received for conducting this study.

Ethical approval: The study was conducted in accordance with the Declaration of Helsinki Ethical Principles for Medical Research Involving Human Subjects and the protocol was approved by the Ethics Committee of Inonu University (Date: 19.07.2023, Meeting No: 2023/4831).

Author Contrubition: Concept: TA, AG, YA, OM, CO, Design: TA, AG, YA, OM, CO, Supervising: TA, AG, YA, OM, CO, Data collection and entry: TA, AG, YA, OM, CO, Analysis and interpretation: TA, AG, YA, OM, CO, Literature

search: TA, AG, YA, OM, CO, Writing: TA, AG, YA, OM, CO, Critical review: TA, OM, CO

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