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ORIGINAL ARTICLE

Determining the Psychological Resilience and Secondary Trauma Stress Levels of Surgical Nurses Caring for Earthquake Victims

Deprem Mağdurlarına Bakım Veren Cerrahi Hemşirelerinin Psikolojik Dayanıklılık ve İkincil Travma Stres Düzeylerinin Belirlenmesi

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ABSTRACT

Aim: This study aimed to determine the psychological resilience and secondary traumatic stress levels of surgical nurses experiencing an earthquake and providing care to earthquake victims and to draw attention to this issue.
Materials and Methods: The study with a descriptiveand cross-sectional design was conducted with 370 surgical nurses from a university hospital experiencing the earthquake and providing care to victims between May and July 2023. Data were collected by the researcher through face-to-face interviews using the Personal Information Form, the Psychological Resilience Scale(PRS), and the Secondary Traumatic Stress Scale Turkish Form (STSS).
Results: The nurses scored 55.1±9.9 (min: 9, max: 83) on PRS, with sub-dimension scores of 17.8±3.9 (min: 2, max: 28) for commitment, 17.4±3.4 (min: 5, max: 27) for control, and 20.4±4.5 (min: 1, max: 29) for challenge. The STSS score was 54±12.3 (min: 17, max: 85). A weak, negative, and significant correlation was found between STSS levels (54±12.3) and PRS levels (r=-0.131, p<0.05).
Conclusions: The study found high levels of secondary traumatic stress in surgical nurses who were earthquake victims and provided care to other earthquake victims. Higher stress levels were associated with lower levels of psychological resilience.

Keywords: Earthquake, earthquake victims, resilience level, secondary traumatic stress, surgical nurses

ÖZ

Amaç: Bu araştırma, depremi yaşayan ve depremzedelere bakım veren cerrahi hemşirelerin psikolojik dayanıklılık ve ikincil travma stres seviyelerini belirlemek ve bu konuya dikkat çekmek amacıyla yapılmıştır.
Gereç ve Yöntemler: Tanımlayıcı ve kesitsel olarak planlanan çalışma, Mayıs-Temmuz 2023 tarihleri arasında bir üniversite hastanesinde çalışan, depremi deneyimleyen ve depremzedelere bakım veren 370 cerrahi hemşiresi ile yürütülmüştür. Veriler araştırmacı tarafından literatür veri tabanında bulunan "Kişisel Bilgi Formu", "Psikolojik Dayanıklılık Ölçeği" ve "İkincil Travma Stres Ölçeği Türkçe Formu" kullanılarak yüz yüze görüşme yoluyla toplanmıştır.
Bulgular: Hemşirelerin dayanıklılık toplam puan ortalaması 55.1±9.9 (min: 9, maks: 83), bağlılık alt boyut puan ortalaması 17.8±3.9 (min: 2, maks: 28), kontrol alt boyut puan ortalaması 17.4±3.4 (min:5, maks:27), zorluk alt boyut puan ortalaması 20.4±4.5 (min:1, maks:29) ve ikincil travmatik stres toplam puan ortalaması 54±12.3 (min:17, maks:85) olarak bulunmuştur. İkincil travmatik stres düzeyleri (54±12.3) ile psikolojik dayanıklılık düzeyleri arasında zayıf düzeyde negatif yönde anlamlı bir ilişki bulunmuştur (r=-131, p<0.05).
Sonuçlar: Deprem mağduru olan ve depremzede hastalara bakım veren cerrahi hemşirelerinde sekonder travmatik stres düzeylerinin yüksek olduğu, stres düzeyleri arttıkça psikolojik dayanıklılık düzeylerinin azaldığı bulunmuştur.

Anahtar Kelimeler: Deprem, deprem mağduru, hemşire, dayanıklılık düzeyi, ikincil travmatik stres

Introduction

Earthquakes represent frequent natural disasters in our country, causing significant losses and presenting multidimensional psychological, social, and economic challenges. These events lead to various forms of devastation, including mortality, bereavement, physical injuries, property destruction, and compromised sense of security (1). While residents of earthquake zones and direct survivors experience the most profound emotional impact, relief workers, volunteers, and support personnel operating in affected regions are similarly vulnerable to psychological consequences (2). Existing research suggests that healthcare workers with prior trauma exposure may experience exacerbated psychological symptoms and elevated STSS levels (3).

The role of healthcare professionals becomes particularly critical during disasters (4). Many face personal losses while simultaneously confronting the trauma of treating victims, witnessing catastrophic events, and absorbing patients' distressing narratives (5). Numerous studies document that professionals providing comprehensive support to disaster victims frequently develop symptoms including anhedonia, dysphoria, depressive states, existential distress, and secondary traumatic stress (6,7). The earthquakesof Kahramanmaraş on 6th February 2023 (magnitudes

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7.7 and 7.6) exemplify this phenomenon, affecting 11 provinces and resulting in thousands of casualties (8). The mass casualty event created extraordinary demands on healthcare systems, exposing workers to extreme operational conditions (9). Healthcare professionals face compounded risks from excessive workloads, sleep deprivation, exhaustion, and chronic stress, all contributing to mental and physical health deterioration (10). Among these occupational hazards, secondary traumatic stress emerges as a particularly concerning psychological outcome (11).

This condition develops through intense empathic engagement with victims' trauma narratives and the psychological burden of reconciling these experiences with reality (12). Trauma-exposed professionals remain especially vulnerable (13), with certain personality traits (e.g., perfectionism, pessimism, excessive need for control) potentially exacerbating susceptibility (14). For nurses, secondary traumatic stress carries significant professional and personal consequences, including diminished work motivation, career changes, and overall health decline (15). While debate continues regarding optimal timing for post-disaster psychosocial interventions, consensus emphasizes the importance of pre-disaster mental health preparedness. This study consequently examines psychological resilience and secondary traumatic stress levels among surgical nurses providing earthquake victim care, aiming to illuminate this critical occupational health issue.

Materials and Methods

This descriptive, cross-sectional study was conducted from May to July 2023 with nurses in the surgical departments of a university hospital. Of the 432 nurses employed in the hospital's surgical clinics, 370 met the inclusion criteria: earthquake exposure, continued employment, provision of care to earthquake victims, and willingness to participate. All nurses received comprehensive information about the study, and written informed consent was obtained before data collection. The researcher collected the data following approval from the Ethics Committee (Decision No: 07/04/2023/64). The study adhered to the principles outlined in the Declaration of Helsinki.

Personal Information Form

The researcher-developed Personal Information Form, informed by a literature review, included 14 questions designed to collect the following information from the nurses: gender, education level, marital status, age, number of children, years of professional experience, work unit, history of earthquake exposure, location at the time of the earthquake, extent of housing damage, experience of losing relatives, accommodation after the earthquake, level of separation anxiety from family/children during work hours, and degree of fear regarding earthquake recurrence (16, 17).

Psychological Resilience Scale(PRS)

PRS" was used to assess nurses' resilience. Developed bylsık in 2016, the scale demonstrated adequate validity and reliability for measuring psychological resilience. This 21-item scale comprises three sub-dimensions: dedication (7 items), control (7 items), and challenge (7 items), with items rated on a 5-point Likert scale. Items are scored from 0 (lowest) to 4 (highest), yielding a total score range of 0 to 84. Response options include: (0) Strongly Disagree, (1) Disagree, (2) Neither Agree nor Disagree, (3) Agree, and (4) Strongly Agree. Items 2 and 15 are reverse-scored (4-3-2-1-0). Higher scores indicate greater resilience (18).

Secondary Traumatic Stress Scale Turkish Form(STSS)

The Turkish version of STSS was used to measure the nurses' traumatic stress.STSS was developed by Bride et al. in 2004, and the Turkish version of STSS was performed by Kahil,anexpert psychologist and psychological counselor,in 2016. The scale consists of 17 items, and the questions are in a 5-point Likert-type format.The scale consists of 17 items, and the questions are in a 5-point Likert type. The scale assesses symptoms experienced in the past 7 days, with items rated as: (1) Never, (2) Rarely, (3) Sometimes, (4) Often, and (5) Very Often.The scale has a possible score range of 17 to 85, where higher scores indicate higher stress levels.

Statistical analysis

SPSS version 22.0 software (IBM Corp., Armonk, NY, USA) was used for all statistical analyses. Categorical variables are summarized using frequency and percentage distributions, and continuous variables are described using means and standard deviations. Group mean comparisons were performed using independent samples t-tests (for two groups) and ANOVA (for three or more groups). When ANOVA results were significant, Bonferroni corrections were used for posthoc comparisons. Pearson correlation analysis was conducted to determine the correlations between scale scores. Statistical significance was set at a p-value of <0.05.

Results

Table 1 presents the participants' demographic

characteristics and average scale scores. Among the participants, 73.2% were women, 50.8% had undergraduate degrees, and 66.5% were married. The mean age was 34±7.8 years (range: 20 to 64), and the mean working time was 12.4±10 years (range: 1 to 45). Before the study, 61.6% of the participants had experienced an earthquake, 81.4% were at home during the earthquake, 68.9% reported no damage to their homes, and 35.4% had lost relatives. The mean total score of PRS was 55.1±9.9 (min: 9, max: 83), with sub-dimension scores of 17.8±3.9 (min: 2, max: 28) for dedication, 17.4±3.4 (min: 5, max: 27) for control, and 20.4±4.5 (min: 1, max: 29) for challenge. The mean STSS score was 54±12.3 (min: 17, max: 85) (Table 1).

Table 1. Demographics of subjects (n=370)

Variables	n	%
Gender		
Female	271	73.2
Male	99	26.8
Education		
High School	113	30.5
AssociateDegree	45	12.2
License	188	50.8
Graduate	24	6.5
Maritalstatus		
Single	124	33.5
Married	246	66.5
Have you experienced an earthquake before?		
Yes	228	61.6
No	142	38.4
Where were you caught in the earthquake?		
House	301	81.4
Hospital	69	18.6
Damage status of your house		
Undamaged	255	68.9
LessDamaged	99	26.8
HeavilyDamaged	14	3.8
Demolished	2	0.5
Did you lose your relative in the earthquake?		
Yes	131	35.4
No	239	64.5
Do you have a hospital disaster plan?		
Yes	210	56.8
No	54	14.6
I don't know	106	28.6
Have you received disaster training?		
Yes	290	78.4
No	80	21.6
	mean±SD	**Min-Max**
Age(years)	34±7.8	20-64
Operation time	12.4±10	1-45
Resilience Scale Sub-Dimensions (PRS)		
Dedication	17.8±3.9	2-28
Control Size	17.4±3.4	5-27
Challenge	20.4±4.5	1-29
Total ScaleScore	55.1±9.9	9-83
Secondary Traumatic Stress Scale Score (ITSS)	54±12.3	17-85

*Data are expressed as numbers (n), frequency (%), mean±SD, and min-max.PRS: Psychological Resilience Scale, SD: Standard deviation,

Table 2 presents findings related to the post-earthquake period. 40.8% of the participants stayed in their own homes, while 33.5% stayed with relatives.While 65.1% of participants reported significant anxiety about leaving their families at home to work, 46% reported occasional earthquake anxiety, and 23% reported constant earthquake anxiety.Furthermore, 83% of the participants felt that their workplace hospital was unsafe (Table 2).

Table 2. Variables Related to the Post-Earthquake Process

Variables	n	%
Where Did You Stay After the Earthquake?		
House	151	40.8
Tent	30	8.1
Dormitory/Guesthouse	26	7
In a Relative's house	124	33.5
Car	39	10.5
Does leaving your family at home while coming to work cause you to feel anxious?		
No	19	5.1
Lowlevel	28	7.6
Medium-level	82	22.2
Toomuch	241	65.1
Do you have anxietyabout an earthquake?		
No	42	11.4
Sometimes	171	46.2
Often	72	19.5
Continually	85	23
Do you think the hospital you work in is safe?		
Yes	63	17
No	307	83

*Data are expressed as numbers (n) and frequency (%)

Table 3 compares participants' characteristics with mean STSS and PRS scores. Educational level was significantly correlated with mean STSSs (F=3.35, p=0.01). Bonferroni posthoc analysis indicated that high school graduates exhibited the highest mean STSS score (53.8±12.7), while postgraduate students exhibited the lowest (46.6±8.8). Previous earthquake experience was negatively correlated with participants' mean PRS scores (t=-2.22, p=0.02), with participants who had experienced an earthquake demonstrating higher mean PRS scores (56±9.2) than those without (53.7±10.8). Mean PRS scores were significantly correlated with participants' residence during the post-earthquake period (F=5.55, p=0.02). Bonferroni posthoc analysis revealed that participants staying with relatives had the highest mean PRS scores (57.4±8.8), whereas those staying in tents had the lowest (48.5±13.1). Both mean PRS and STSS scores were significantly correlated with participants' anxiety levels about leaving their families to work (F=3.39, p=0.01; F=23.5, p<0.001, respectively). Specifically, the Bonferroni posthoc analysis showed that the mean PRS score was highest for those reporting no anxiety (60.7±7.1) and lowest for those reporting low anxiety (54.1±8.6), while participants with high anxiety had the highest mean STSS score (57.5±11.3) and those with minimal anxiety had the lowest (43.2±14.4). The level of earthquake anxiety was significantly correlated with participants' mean STSS scores (F=6.45, p<0.001). Bonferroni posthoc analysis indicated that participants experiencing frequent fears of earthquakes had the highest mean score (55.2±9.0), and those not experiencing anxiety had the lowest

Table 3. Comparison of Individual Resilience and Secondary Traumatic Stress Scores with Individual Characteristics of Participants

Variables	n (%)	PRS Mean±SD (%)	STSS Mean±SD (%)
Educational Status			
High School (1)	113	53.5±10.8	53.8±12.7
Associate (2)	45	56.3±12	55.5±11.2
Bachelor (3)	188	55.8 ±8.6	54 ±12.3
Graduate (4)	24	54.9 ±9.9	46.6±8.8
	Analysis Possibility	F= 1.48, p=0.21	F= 3.35, **p=0.01***
	Significant Difference		2>3>1>4
Have You Experienced an Earthquake Before?			
No (1)	142	53.7±10.8	55.2±11.6
Yes (2)	228	56±9.2	53.2±12.7
	Analysis Possibility	t= -2.22 **p=0.02****	t= 1.49, p=0.13
	Significant Difference	2>1	
Where Did You Stay After the Earthquake?			
Home (1)	151	55.2±9.9	52.7±12.6
Tent (2)	30	48.5±13.1	54.8±13.2
Dormitory/Guesthouse (3)	26	53.4±9.9	53.8±12.8
Relative (4)	124	57.4±8.8	54±11.9
Car (5)	39	53.8±7.7	58.3±11.2
	Analysis Possibility	F= 5.55 **p=0.02***	F= 1.64, p=0.16
	Significant Difference	4>1>5>3>2	
Does Leaving Your Family At Home While Coming to Work Cause You Anxiety?			
No (1)	19	60.7±7.1	43.2±14.4
Low (2)	28	54.1±8.6	46±12.1
Intermediate (3)	82	56.6±8.8	48.9±10.2
Toomuch (4)	241	54.3±10.4	57.5±11.3
	Analysis Possibility	F= 3.39 **p=0.01***	F= 23.5, **p=0.00***
	Significant Difference	1>3>>4>2	4>3>2>1
Do You Have Anxiety About An Earthquake?			
No (1)	42	56.1±9.5	46.3±13.1
Sometimes (2)	171	54.9±8.9	54.9±13.2
Often (3)	72	55±9.9	55.2±9
Continuous (4)	85	55±11.9	54.9±11.2
	Analysis Possibility	F= 0,16 p=0,92	F= 6.45, **p=0.00***
	Significant Difference		3>2=4>1
Have you received Disaster Training?			
Yes (1)	290	55.5±9.8	52.9±11.9
No (2)	80	53.9±10.3	57.9±13.2
	Analysis Possibility	t= 1.25 p=0.21	t= -3.2, **p=0.00****
	Significant Difference		2>1
Do you think the hospital you work in is safe?			
Yes (1)	63	56.6±11.2	49.9±13.9
No (2)	307	54.8±9.6	54.9±11.8
	Analysis Possibility	t= 1.33 p=0.18	t= -2.9, **p=0.00****
	Significant Difference		2>1

Data are expressed as numbers (n), mean±SD, OneWay ANOVA**and Student t test*.PRS: Psychological Resilience Scale, SD: Standard deviation, STSS: Secondary Traumatic Stress Scale Turkish Form

(46.3±13.1). Disaster education was significantly and negatively correlated with mean STSS scores (t=-3.2, p<0.001), with participants who received training having lower mean STSS scores (52.9±11.9) than those who did not (57.9±13.2). Finally, participants' perception of hospital safety during earthquakes was significantly and negatively related to their mean STSS scores (t=-2.9, p<0.001), with participants feeling their hospital was safe having lower mean scores (49.9±3.9) than those feeling it was unsafe (54.9±11.8) (Table 3).

Table 4 shows the correlation between participants' mean PRS and STSS scores. The analysis revealed a statistically significant, weak negative correlation between PRS and STSS (r=-0.131, p<0.05), suggesting that higher resilience is associated with lower secondary traumatic stress.

Table 4. Evaluation of the Relationship between the Resilience of the Participants and their Secondary Traumatic Stress

	Secondary Traumatic Stress Level	
Resilience Level	Pearson r	-,131
	p	0.01
	n	370

*Thecorrelation is significant at the p<0.05 level.

Discussion

The devastating earthquake affected 11 provinces, including the hospital where this studywas performed. The experience of providing care to disaster victims, listening to harrowing accounts from those affected, witnessing numerous deaths, and facing the overwhelming inability to meet the needs of hundreds of individuals can induce significant secondary traumatization in nurses (20, 21). This study underscores the profound impact on surgical nurses, who were uniquely positioned as both earthquake victims and caregivers to fellow victims. These nurses demonstrated moderate PRS (55.1±9.9) and alarmingly high levels of STSS (54±12.3). Individuals with direct exposure to the earthquake's trauma, such as those trapped in the wreckage, those suffering the loss of relatives, those sustaining injuries, and those enduring major disruptions to their physical and social environments, are particularly vulnerable to emotional sequelae. Moreover, a substantial segment of the community involved in the disaster response, encompassing witnesses, officials, volunteers, and aid providers, is also affected (2). Immediate responses may manifest as reliving the event, vivid flashbacks, intrusive imagery, recurrent nightmares, acute anxiety, intense fear, and physical symptoms including breathing difficulties and palpitations. Prolonged reactions to such losses frequently include avoidance of trauma reminders, emotional numbing, impaired concentration, hyperarousal, heightened startle response, irritability, persistent anxiety, and profound grief (22). In the current study, a significant majority (65%) of participants reported considerable anxiety related to leaving their families to attend work, nearly a quarter (23%) reported persistent worry about the threat of aftershocks, and a large majority (83%) expressed serious concerns regarding the safety of their workplace hospital. These findings strongly suggest that, despite the consistency with expected post-earthquake responses, the participants experienced a clinically significant degree of anxiety.

The increased demands placed on health workers during disasters can lead to significant stress and psychological problems. For nurses directly involved in disaster response, this can result in physical health issues, workforce shortages, and a decline in professional practice standards (21). Disasters can also cause nurses to experience profound loneliness, burnout, and despair due to the disruption of their families and living environments (20). Disaster settings present a heightened risk of burnout, as many healthcare workers and their families are directly affected by events such as earthquakes through hospital damage or destruction and increased workloads. To mitigate the increased working hours, fear, anxiety, and worry experienced by healthcare professionals, it is crucial to establish safe and supportive working environments for all professionals in the affected region, including support staff. Furthermore, secondary traumatization exacerbates the risk of burnout (23). In line with the study's findings, nurses' diminished PRS and heightened STSScorrelate with leaving their families to work and perceiving their workplace as unsafe. Consequently, it is recommended that all health personnel receive comprehensive disaster health services training through various courses, training programs, and practical exercises, both during and after their professional training. The responsibilities of health professionals in disaster situations, their interprofessional communication, and the availability of essential medical supplies should be clearly defined in advance (24). Notably, in this study, nurses receivingeducation fordisaster demonstrated lower levels of secondary psychological stress, consistent with findings in the broader literature. This reduction is likely attributable to the increased clarity regarding

roles, responsibilities, material supply protocols, and communication strategies facilitated by the education.

To promote workers' psychological well-being and ensure effective psychosocial interventions, the literature suggests further studies on preventing secondary trauma, both in the immediate aftermath of a disaster and in the long term (22). Given that psychological resilience is a key protective factor for individuals working in high-risk environments (25), initial support following a disaster should prioritize psychological first aid over psychotherapy or medication, even if trauma-related symptoms appear shortly after the event (2). In this study, a weak negative correlation ($r = -0.131$, $p < 0.05$) was found between surgical nurses' PRS and STSS levels. Aligning with existing literature, higher psychological resilience was associated with lower secondary traumatic stress. Consequently, these findings underscore the importance of enhancing psychological resilience to mitigate secondary traumatic stress, thus highlighting the necessity of relevant interventions.

Conclusion

This study revealed that surgical nurses both enduring the earthquake and subsequently providing care to victims demonstrated elevated levels of secondary traumatic stress. In line with this, increased stress was associated with decreased psychological resilience. Earthquakes have a detrimental impact on societal mental well-being, affecting not only those directly impacted but also the nurses delivering care. The severity of the earthquake, coupled with inadequate resources and damage to healthcare facilities, may result in the neglect of secondary psychological trauma. Accordingly, it is crucial to evaluate nurses exposed to the earthquake and to provide essential psychological support.

Limitations of the Study

The findings of this study may not be generalizable to all nurses, as the research was conducted with nurses working in the surgical departments of a single hospital in the earthquake-affected province.

Conflict of Interest

The authors declare no potential conflicts of interest regarding the research, authorship, and/or publication of this article.

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