

# Psychological Distress, Job Performance, and Institutional Support in Operating Room and Intensive Care Unit Personnel After the 2025 Silivri Earthquake

## 2025 Silivri Depremi Sonrasında Ameliyathane ve Yoğun Bakım Personelinde Psikolojik Sıkıntı, İş Performansı ve Kurumsal Destek

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### ABSTRACT

**Background:** This study evaluated depression, anxiety, stress, perceived institutional support, and job performance among operating room and intensive care unit personnel following the April 23, 2025 Silivri earthquake.

**Materials and Methods:** This descriptive cross-sectional study included 110 healthcare professionals working in operating rooms and intensive care units. Data were collected using the Depression Anxiety Stress Scale-21 (DASS-21), the State-Trait Anxiety Inventory-State subscale (STAI-S), and researcher-developed questionnaires assessing job performance and perceived institutional support. Spearman correlation, Mann-Whitney U, Kruskal-Wallis, and multiple linear regression analyses were performed. Internal consistency was assessed using Cronbach's alpha.

**Results:** Of the participants, 50.9% were female. Mean DASS-21 scores were  $11.78 \pm 8.10$  for depression,  $6.56 \pm 6.59$  for anxiety, and  $10.82 \pm 8.53$  for stress. At least mild depressive symptoms were present in 61.8% of participants, and 38.2% had anxiety scores above the normal range according to the DASS-21. The mean STAI-S score was  $42.12 \pm 11.24$ . Mean perceived institutional support and job performance scores were  $2.46 \pm 3.49$  and  $18.15 \pm 5.31$ , respectively. STAI-S scores were negatively correlated with job performance ( $p = -0.565$ ,  $p < 0.001$ ) but not with perceived institutional support ( $p = -0.104$ ,  $p = 0.279$ ). Female participants had significantly higher STAI-S scores ( $p = 0.014$ ). In the multivariable model, self-reported job performance impairment and concern about future earthquakes were significant factors associated with higher state anxiety.

**Conclusion:** A substantial proportion of operating room and intensive care unit personnel experienced clinically relevant depressive and anxiety symptoms following the Silivri earthquake. Higher state anxiety was associated with poorer job performance. Concern about future earthquakes and self-reported job performance impairment were significant factors associated with higher state anxiety. Despite widespread psychological distress, the use of professional psychological support was very limited. Disaster preparedness programmes for these personnel may benefit from incorporating measures that strengthen psychological resilience.

**Keywords:** Earthquakes, anxiety, operating rooms, intensive care units, health personnel, social support, work performance

### ÖZ

**Amaç:** Bu çalışmada, 23 Nisan 2025 Silivri depremi sonrasında ameliyathane ve yoğun bakım personelinde depresyon, anksiyete, stres, algılanan kurumsal destek ve iş performansı değerlendirildi.

**Gereç ve Yöntemler:** Bu tanımlayıcı kesitsel çalışmaya ameliyathane ve yoğun bakım ünitelerinde görev yapan 110 sağlık profesyoneli dahil edildi. Veriler Depresyon Anksiyete Stres Ölçeği-21 (DASS-21), Durumluk-Sürekli Kaygı Envanteri Durumluk Kaygı Alt Ölçeği (STAI-S) ve iş performansı ile algılanan kurumsal desteği değerlendirmek amacıyla araştırmacılar tarafından geliştirilen anketler kullanılarak toplandı. İstatistiksel analizlerde Spearman korelasyon analizi, Mann-Whitney U testi, Kruskal-Wallis testi ve çoklu doğrusal regresyon analizi kullanıldı. Ölçeklerin iç tutarlılığı Cronbach alfa katsayısı ile değerlendirildi.



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**Received:** 24.03.2026 **Accepted:** 21.08.2026 **Epub:** 15.10.2026

**Cite this article as:** Emirkadi H, Karakullukcu HK. Psychological distress, job performance, and institutional support in operating room and intensive care unit personnel after the 2025 Silivri earthquake. Hamidiye Med J. [Epub Ahead of Print]



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**Bulgular:** Katılımcıların %50,9'u kadındı. DASS-21 ortalama puanları depresyon için  $11,78 \pm 8,10$ , anksiyete için  $6,56 \pm 6,59$  ve stres için  $10,82 \pm 8,53$  olarak bulundu. Katılımcıların %61,8'inde en az hafif düzeyde depresif belirtiler vardı ve %38,2'sinde DASS-21'e göre anksiyete puanları normal aralığın üzerindeydi. Ortalama STAI-S puanı  $42,12 \pm 11,24$  idi. Algılanan kurumsal destek ve iş performansı ortalama puanları sırasıyla  $2,46 \pm 3,49$  ve  $18,15 \pm 5,31$  olarak bulundu. STAI-S puanı ile iş performansı arasında negatif yönde anlamlı ilişki saptanırken ( $p = -0,565$ ;  $p < 0,001$ ), algılanan kurumsal destek ile anlamlı ilişki bulunmadı ( $p = -0,104$ ;  $p = 0,279$ ). Kadın katılımcıların STAI-S puanları anlamlı olarak daha yüksekti ( $p = 0,014$ ). Çok değişkenli analizde, depremin iş performansını etkilediğine ilişkin özbidirim ile gelecekteki depremlere yönelik endişe düzeyi, daha yüksek durumluk kaygı ile anlamlı biçimde ilişkili bulundu.

**Sonuç:** Silivri depremi sonrasında ameliyathane ve yoğun bakım personelinin önemli bir bölümünde klinik açıdan anlamlı depresyon ve anksiyete belirtileri görüldü. Daha yüksek durumluk kaygı, daha düşük iş performansı ile ilişkiliydi. Gelecekteki depremlere yönelik endişe ile depremin iş performansını etkilediğine ilişkin özbidirim, daha yüksek durumluk kaygı ile anlamlı biçimde ilişkiliydi. Yaygın psikolojik sıkıntıya karşı profesyonel psikolojik destek kullanımı oldukça sınırlıydı. Bu personel grubuna yönelik afet hazırlık programları, psikolojik dayanıklılığı güçlendirmeye yönelik uygulamaların eklenmesinden yarar sağlayabilir.

**Anahtar Kelimeler:** Deprem, anksiyete, ameliyathane, yoğun bakım ünitesi, sağlık personeli, sosyal destek, iş performansı

## Introduction

On February 6, 2023, two major earthquakes struck Türkiye and Syria, resulting in tens of thousands of deaths and affecting millions of people (1). Located on the Alpine–Himalayan seismic belt, Türkiye has experienced numerous devastating earthquakes throughout its history. As a result, public awareness of earthquake risk remains high.

Earthquakes cause not only physical destruction but also substantial psychological distress. Healthcare professionals face a dual burden during disasters. They are both members of the affected community and frontline professionals expected to continue providing care under demanding conditions. Personal losses, the impact on colleagues, exposure to traumatic events, and increased workload may all contribute to higher levels of anxiety, depression, and stress among healthcare workers (2).

Operating rooms and intensive care units require sustained attention, rapid decision-making, and continuous clinical performance. The margin for error is small, and critical decisions often need to be made within a limited time. These demands become even greater during extraordinary events. Studies conducted during the Coronavirus Disease-2019 pandemic reported increased psychological distress among operating room nurses and anaesthesia personnel (3).

Türkiye, because of its location along the North Anatolian Fault, faces a constant earthquake risk. Previous studies have shown that fear of earthquakes is associated with psychological distress (4). The earthquake that occurred off the coast of Silivri on April 23, 2025, renewed concerns about the possibility of a major Marmara earthquake. Models predicting an earthquake of magnitude 7.0 or greater in the Sea of Marmara have been discussed for many years (5,6).

The present study evaluated anxiety, depression, and stress levels, together with perceived institutional support

and job performance, among operating room and intensive care unit personnel following the Silivri earthquake of April 23, 2025, in the context of the anticipated Marmara earthquake. Although several studies have examined the psychological well-being of healthcare workers after disasters, evidence focusing specifically on operating room and intensive care personnel remains limited (2). Unlike previous studies conducted after large-scale destructive earthquakes, this study examined psychological status during a period characterized by concern about a future major earthquake, rather than concern about its immediate consequences. Factors associated with state anxiety were further explored using multivariable analyses.

## Materials and Methods

### Study Design and Participants

This descriptive cross-sectional study was conducted from May to July 2025 among healthcare professionals working in operating rooms and intensive care units. Participation was voluntary. The questionnaire was administered both in paper form and online. The online version was created using Google Forms.

Healthcare professionals who were actively working in an operating room or intensive care unit, who agreed to participate voluntarily, and who completed the questionnaire were eligible for inclusion. Individuals who were not actively working in these units or who submitted incomplete questionnaires were excluded.

The survey was anonymous, and no personally identifiable information was collected. All participants read and approved the informed consent statement before completing the questionnaire. The estimated completion time was 10–15 minutes.

## Data Collection

The questionnaire included sections on demographic characteristics, earthquake-related experiences, psychological assessment scales, job performance, perceived institutional support, and open-ended questions. Demographic variables included age, sex, marital status, educational level, professional title, years of professional experience, institution type, and current workplace. Earthquake-related questions addressed participants' presence in the hospital during the earthquake, psychological impact at that time, damage to their home, their level of concern about future earthquakes, effects on job performance, and receipt of psychological support.

Psychological symptoms were assessed using the Depression Anxiety Stress Scale-21 (DASS-21) and the State-Trait Anxiety Inventory-State (STAI-S). The DASS-21 is a 21-item instrument that measures symptoms of depression, anxiety, and stress. Each subscale consists of seven items rated on a four-point Likert scale ranging from 0 to 3. Subscale scores were classified according to established cut-off values. The STAI-S is a 20-item instrument designed to assess state anxiety at a specific point in time. Items are scored from 1 to 4, with positively worded items reverse scored. Higher scores on both instruments indicate greater psychological symptom burden (7,8).

Researcher-developed questionnaires were used to assess job performance and perceived institutional support. Each scale consisted of five items. Job performance items were rated on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree). Negatively worded items were reverse scored, producing a total score ranging from 5 to 25, with higher scores indicating better job performance. Perceived institutional support items were scored from 0 to 4, producing a total score ranging from 0 to 20, with higher scores indicating greater perceived support. Item development was informed by previous studies on post-disaster occupational functioning and organisational support among healthcare workers (13-16). Internal consistency was evaluated in the present sample. Cronbach's alpha was 0.846 for the job performance scale and 0.852 for the perceived institutional support scale, indicating good internal consistency.

The questionnaire also included three open-ended questions exploring the main occupational challenges experienced after the earthquake, sources of support during the recovery period, and suggestions for institutional improvement. As these responses were qualitative and required a separate analytical framework, only quantitative findings are presented in this report.

## Ethics

The study was conducted in accordance with the principles of the Declaration of Helsinki. Ethical approval was obtained from the University of Health Sciences Türkiye, Sancaktepe Şehit Prof. Dr. İlhan Varank Training and Research Hospital Ethics Committee on May 14, 2025 (decision number: 2025/157). Institutional identifiers were removed for blinded peer review. Participation was voluntary, and written informed consent was obtained from all participants before data collection.

## Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics for Windows, version 29.0 (IBM Corp., Armonk, NY, USA). Continuous variables are presented as mean, standard deviation, minimum, and maximum values. Categorical variables are presented as frequencies and percentages. Data normality was assessed using the Shapiro-Wilk test. As the data were not normally distributed, non-parametric methods were used where appropriate.

Associations between state anxiety, perceived institutional support, and job performance were evaluated using Spearman's rank correlation coefficient. Group comparisons by sex, clinical unit, psychological impact at the time of the earthquake, and self-reported effect of the earthquake on job performance were conducted using the Mann-Whitney U test. Differences in state anxiety across levels of concern about future earthquakes were examined using the Kruskal-Wallis test.

Multiple linear regression analysis was performed to identify factors associated with state anxiety after adjustment for potential confounders. The STAI-S score was entered as the dependent variable. Sex, clinical unit, psychological impact, self-reported effect on job performance, level of concern about future earthquakes (coded as an ordinal variable from 0 to 5), and age group were entered as independent variables.

Internal consistency was assessed using Cronbach's alpha for all validated scales and researcher-developed instruments. A post-hoc power analysis was performed for the primary correlation analysis using the observed effect size ( $\rho = 0.565$ ) and a sample size of 110. Statistical power exceeded 0.99 at a significance level of 0.05. A two-sided p value of was considered statistically significant.

## Results

A total of 110 healthcare professionals working in operating rooms and intensive care units participated in the

study. Of these, 56 (50.9%) were female and 54 (49.1%) were male. The age distribution was as follows: 22 participants (20.0%) were 20–30 years old, 47 (42.7%) were 30–40 years old, 27 (24.6%) were 40–50 years old, and 14 (12.7%) were 50 years or older. Sixty-one participants (55.4%) were married and 49 participants (44.6%) were single. Regarding educational level, 12 participants (10.9%) had completed high school or an associate degree, 53 (48.2%) had a bachelor's degree, and 45 (40.9%) had a postgraduate degree. Sixty-seven participants (60.9%) worked in operating rooms and 43 (39.1%) worked in intensive care units. Seventy-two participants (65.5%) were employed in training and research hospitals or city hospitals, 20 (18.2%) were employed in state hospitals, and 18 (16.4%) were employed in private institutions. Participant characteristics are presented in Table 1.

Regarding earthquake-related experiences, 31 participants (28.2%) reported being in the hospital at the time of the earthquake, and 65 (59.1%) reported being psychologically affected. Only three participants (2.7%) reported damage to their homes. Concerning future earthquakes, 41 participants (37.3%) reported moderate concern, 38 (34.5%) reported high concern, and 14 (12.7%) reported very high concern (Figure 1). Thirty-six participants (32.7%) reported that the earthquake affected their job performance, whereas only two (1.8%) reported receiving psychological support. Earthquake-related experiences are summarised in Table 2.

Mean DASS-21 scores were  $11.78 \pm 8.10$  for depression,  $6.56 \pm 6.59$  for anxiety,  $10.82 \pm 8.53$  for stress, and  $29.16 \pm 18.50$  for the total score. Cronbach's alpha coefficients were 0.722, 0.737, and 0.809 for the depression, anxiety, and stress subscales, respectively, indicating acceptable to good internal consistency.

Based on the standard clinical cut-off values, 38.2% of participants were classified as normal on the depression subscale, 17.3% as mild, 37.3% as moderate, 4.5% as severe, and 2.7% as extremely severe. For the anxiety subscale, 61.8% were within the normal range, whereas 13.6% had mild symptoms, 13.6% moderate symptoms, 7.3% severe symptoms, and 3.6% extremely severe symptoms. On the stress subscale, 75.5% of participants were classified as normal, 8.2% as mild, 8.2% as moderate, 6.4% as severe, and 1.8% as extremely severe. Detailed DASS-21 results are presented in Table 3.

The mean STAI-S score was  $42.12 \pm 11.24$ , with values ranging from 20 to 71. Cronbach's alpha for the STAI-S was 0.881, indicating good internal consistency. The mean perceived institutional support score was  $2.46 \pm 3.49$  (Cronbach's alpha = 0.852), and the mean job performance score was  $18.15 \pm 5.31$  (Cronbach's alpha = 0.846). STAI-S,

**Table 1. Demographic characteristics of the participants.**

| Variable                                     | n   | %     |
|----------------------------------------------|-----|-------|
| Total participants                           | 110 | 100.0 |
| Female                                       | 56  | 50.9  |
| Male                                         | 54  | 49.1  |
| 20–30 years                                  | 22  | 20.0  |
| 30–40 years                                  | 47  | 42.7  |
| 40–50 years                                  | 27  | 24.6  |
| ≥50 years                                    | 14  | 12.7  |
| Married                                      | 61  | 55.4  |
| Single                                       | 49  | 44.6  |
| High school or associate degree              | 12  | 10.9  |
| Bachelor's degree                            | 53  | 48.2  |
| Postgraduate degree                          | 45  | 40.9  |
| Operating room                               | 67  | 60.9  |
| Intensive care unit                          | 43  | 39.1  |
| Training and research hospital/city hospital | 72  | 65.5  |
| State hospital                               | 20  | 18.2  |
| Private institution                          | 18  | 16.4  |

perceived institutional support, and job performance scores are presented in Table 4.

Spearman correlation analysis indicated a very weak negative association between STAI-S scores and perceived institutional support ( $\rho = -0.104$ ,  $p = 0.279$ ). In contrast, STAI-S scores were negatively correlated with job performance ( $\rho = -0.565$ ,  $p < 0.001$ ; Figure 2). Correlation results are presented in Table 5.

Subgroup analyses are presented in Table 6. Female participants had significantly higher STAI-S scores than male participants ( $44.59 \pm 10.31$  vs.  $39.56 \pm 11.69$ ;  $U = 1925$ ,  $p = 0.014$ ). No significant difference in STAI-S scores was observed between operating room and intensive care unit personnel ( $40.84 \pm 9.80$  vs.  $44.12 \pm 13.06$ ;  $U = 1250$ ,  $p = 0.245$ ). Participants who reported that the earthquake had affected their job performance had significantly higher STAI-S scores than those who did not ( $45.81 \pm 12.81$  vs.  $40.32 \pm 10.00$ ;  $U = 1692$ ,  $p = 0.022$ ). STAI-S scores did not differ significantly according to psychological impact at the time of the earthquake ( $43.31 \pm 10.83$  vs.  $40.40 \pm 11.72$ ;  $p = 0.135$ ). State anxiety also did not differ significantly across levels of concern about future earthquakes (Kruskal-Wallis  $H = 9.028$ ,  $p = 0.108$ ), although participants reporting very high concern had higher mean STAI-S scores than those reporting no concern ( $49.57 \pm 15.96$  vs.  $36.71 \pm 13.21$ ).

Multiple linear regression results are presented in Table 7. The overall model was statistically significant ( $F(6,103) = 3.043$ ,  $p = 0.009$ ,  $R^2 = 0.151$ , adjusted  $R^2 = 0.101$ ). Self-

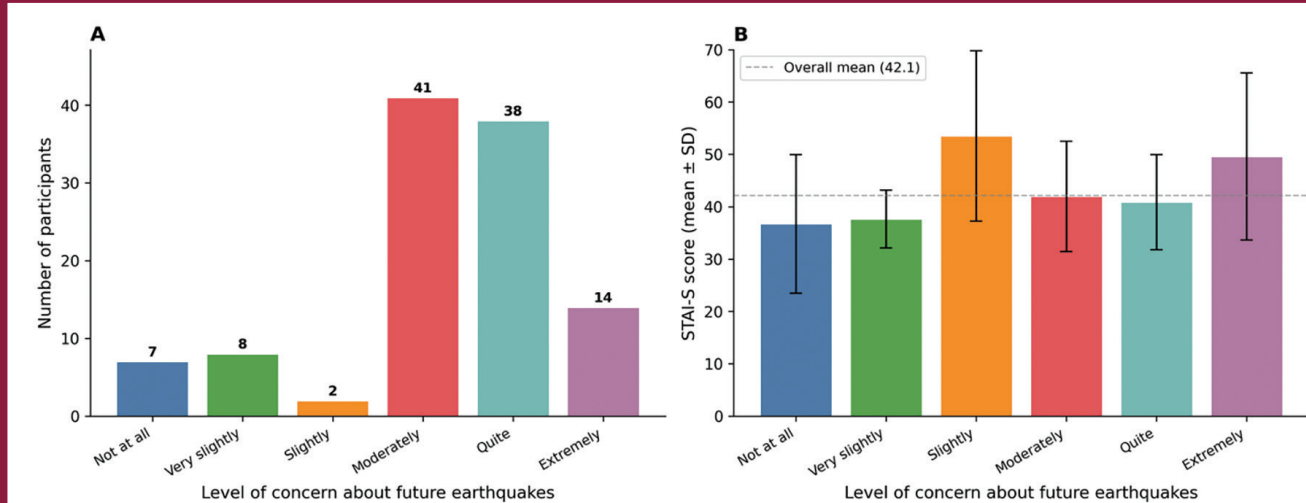


**Figure 1.** Distribution of concern about future earthquakes and STAI-S scores among operating room and intensive care unit personnel (n = 110). Panel A shows the number of participants in each concern category. Panel B shows mean STAI-S scores ( $\pm$  SD) by concern level; the dashed line indicates the overall sample mean (42.12). Kruskal-Wallis test:  $H = 9.028$ ,  $p = 0.108$ . STAI-S, State-Trait Anxiety Inventory-State; SD, standard deviation.

**Table 2. Responses related to earthquake experience.**

| Variable                                                    | Response                | n   | %    |
|-------------------------------------------------------------|-------------------------|-----|------|
| Were you in the hospital at the time of the earthquake?     | Yes                     | 31  | 28.2 |
|                                                             | No                      | 79  | 71.8 |
| Were you psychologically affected at that moment?           | Yes                     | 65  | 59.1 |
|                                                             | No                      | 45  | 40.9 |
| Was your home damaged because of the earthquake?            | Yes                     | 3   | 2.7  |
|                                                             | No                      | 107 | 97.3 |
| Are you concerned about future earthquakes?                 | Not at all concerned    | 7   | 6.4  |
|                                                             | Very slightly concerned | 8   | 7.3  |
|                                                             | Slightly concerned      | 2   | 1.8  |
|                                                             | Moderately concerned    | 41  | 37.3 |
|                                                             | Quite concerned         | 38  | 34.5 |
|                                                             | Extremely concerned     | 14  | 12.7 |
| Did the earthquake affect your job performance?             | Yes                     | 36  | 32.7 |
|                                                             | No                      | 74  | 67.3 |
| Did you receive psychological support after the earthquake? | Yes                     | 2   | 1.8  |
|                                                             | No                      | 108 | 98.2 |

reported impact of the earthquake on job performance ( $B = 4.882$ ,  $\beta = 0.205$ ,  $p = 0.037$ ) and level of concern about future earthquakes ( $B = 1.722$ ,  $\beta = 0.199$ ,  $p = 0.032$ ) were significantly associated with higher STAI-S scores, after adjustment for the other variables in the model. Female sex

was positively associated with higher state anxiety, but this association did not reach statistical significance ( $B = 3.589$ ,  $\beta = 0.160$ ,  $p = 0.092$ ). Clinical unit, psychological impact at the time of the earthquake, and age group were not significant predictors of STAI-S scores.

**Table 3. DASS-21 findings.**

| Subscale    | Mean $\pm$ SD     | Clinical interpretation                                                           |
|-------------|-------------------|-----------------------------------------------------------------------------------|
| Depression  | 11.78 $\pm$ 8.10  | Normal: 38.2%; mild: 17.3%; moderate: 37.3%; severe: 4.5%; extremely severe: 2.7% |
| Anxiety     | 6.56 $\pm$ 6.59   | Normal: 61.8%; mild: 13.6%; moderate: 13.6%; severe: 7.3%; extremely severe: 3.6% |
| Stress      | 10.82 $\pm$ 8.53  | normal: 75.5%; mild: 8.2%; moderate: 8.2%; severe: 6.4%; extremely severe: 1.8%   |
| Total score | 29.16 $\pm$ 18.50 | —                                                                                 |

DASS-21, Depression Anxiety Stress Scale-21; SD, standard deviation.

**Table 4. STAI-S, perceived institutional support, and job performance scores.**

| Measure                         | Mean $\pm$ SD     | Range | Cronbach's $\alpha$ |
|---------------------------------|-------------------|-------|---------------------|
| STAI-S                          | 42.12 $\pm$ 11.24 | 20–71 | 0.881               |
| Perceived institutional support | 2.46 $\pm$ 3.49   | 0–20  | 0.852               |
| Job performance                 | 18.15 $\pm$ 5.31  | 5–25  | 0.846               |

STAI-S, State-Trait Anxiety Inventory-State; SD, standard deviation.

**Table 5. Spearman correlation analysis between STAI-S, perceived institutional support, and job performance.**

| Variables                                                | Spearman's $\rho$ | p value | Interpretation                          |
|----------------------------------------------------------|-------------------|---------|-----------------------------------------|
| STAI-S $\leftrightarrow$ perceived institutional support | –0.104            | 0.279   | Very weak negative association          |
| STAI-S $\leftrightarrow$ job performance                 | –0.565            | <0.001  | Moderate-to-strong negative association |

STAI-S, State-Trait Anxiety Inventory-State.

**Table 6. Subgroup comparisons of STAI-S scores.**

| Variable                                       | Group                   | n  | STAI-S mean $\pm$ SD | p value |
|------------------------------------------------|-------------------------|----|----------------------|---------|
| Sex                                            | Female                  | 56 | 44.59 $\pm$ 10.31    | 0.014   |
|                                                | Male                    | 54 | 39.56 $\pm$ 11.69    |         |
| Clinical unit                                  | Operating room          | 67 | 40.84 $\pm$ 9.80     | 0.245   |
|                                                | Intensive care unit     | 43 | 44.12 $\pm$ 13.06    |         |
| Psychologically affected at time of earthquake | Yes                     | 65 | 43.31 $\pm$ 10.83    | 0.135   |
|                                                | No                      | 45 | 40.40 $\pm$ 11.72    |         |
| Earthquake affected job performance            | Yes                     | 36 | 45.81 $\pm$ 12.81    | 0.022   |
|                                                | No                      | 74 | 40.32 $\pm$ 10.00    |         |
| Concern about future earthquakes <sup>1</sup>  | Not at all              | 7  | 36.71 $\pm$ 13.21    | 0.108   |
|                                                | Very slightly concerned | 8  | 37.62 $\pm$ 5.53     |         |
|                                                | Slightly concerned      | 2  | 53.50 $\pm$ 16.26    |         |
|                                                | Moderately concerned    | 41 | 41.98 $\pm$ 10.52    |         |
|                                                | Quite concerned         | 38 | 40.87 $\pm$ 9.08     |         |
|                                                | Extremely concerned     | 14 | 49.57 $\pm$ 15.96    |         |

<sup>1</sup>Kruskal-Wallis test; all other comparisons by Mann-Whitney U test. STAI-S: State-Trait Anxiety Inventory-State subscale; SD: standard deviation.

**Table 7. Multiple linear regression analysis: factors associated with STAI-S score.**

| Variable                                      | B      | SE    | $\beta$ | p value |
|-----------------------------------------------|--------|-------|---------|---------|
| Sex (female = 1)                              | 3.589  | 2.111 | 0.160   | 0.092   |
| Unit (ICU = 1)                                | 2.106  | 2.124 | 0.092   | 0.324   |
| Psychologically affected (yes = 1)            | 1.136  | 2.221 | 0.050   | 0.610   |
| Earthquake affected job performance (yes = 1) | 4.882  | 2.308 | 0.205   | 0.037*  |
| Concern about future earthquakes (0–5)        | 1.722  | 0.792 | 0.199   | 0.032*  |
| Age group                                     | –0.987 | 1.109 | –0.082  | 0.375   |

\* $p < 0.05$ . B: unstandardized coefficient; SE: standard error;  $\beta$ : standardized coefficient. Overall model:  $F(6,103) = 3.043$ ,  $p = 0.009$ ,  $R^2 = 0.151$ , adjusted  $R^2 = 0.101$ . STAI-S: State-Trait Anxiety Inventory-State subscale; ICU, intensive care unit.

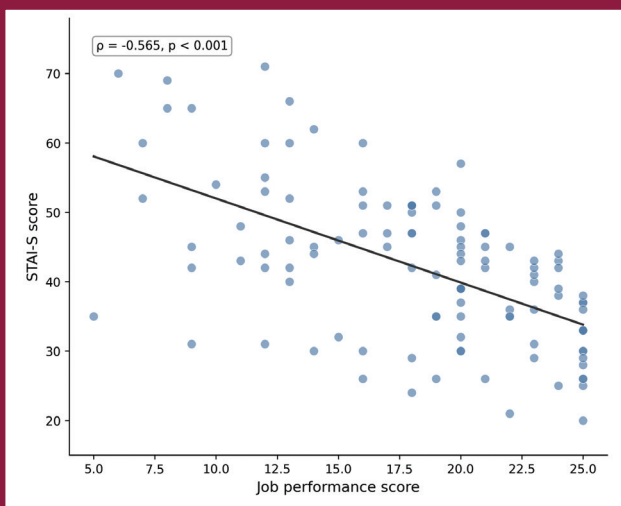


**Figure 2.** Scatter plot of the association between STAI-S score and job performance score in operating room and intensive care unit personnel ( $n = 110$ ). Each point represents one participant. The solid line indicates the linear trend. Spearman  $\rho = -0.565$ ,  $p < 0.001$ . STAI-S, State-Trait Anxiety Inventory-State.

## Discussion

This study evaluated the psychological status of operating room and intensive care unit personnel following the Silivri earthquake of April 23, 2025. Although the overall level of state anxiety was low to moderate, a substantial proportion of participants exhibited clinically relevant depressive and anxiety symptoms. These findings suggest that average group scores alone may underestimate the psychological burden experienced by individual healthcare professionals. Female participants showed higher state anxiety in the subgroup analysis, although this association was not retained after adjustment in the multivariable model. In addition, self-reported job performance impairment and concern about future earthquakes emerged as significant factors associated with state anxiety.

The earthquake-related findings provide important context for interpreting the psychological outcomes. Approximately one-third of participants were in the hospital at the time of the earthquake, and more than half reported psychological effects. In contrast, only three participants reported damage to their homes. Most participants reported moderate to very high levels of concern about future earthquakes. Together, these findings suggest that the psychological burden observed in this cohort cannot be explained solely by direct earthquake exposure. Ongoing concern about a future major earthquake may also have contributed.

Previous studies conducted after the Kahramanmaraş earthquakes reported substantial increases in symptoms of depression, anxiety, stress, and post-traumatic stress among healthcare workers (2,9). The pattern of psychological symptoms observed in our study differed from those reported after previous disasters, possibly reflecting differences in the nature of exposure. Rather than experiencing the immediate consequences of a major earthquake, our participants were working under persistent uncertainty about a possible future disaster. Nevertheless, a considerable proportion of participants reported depression and anxiety symptoms above the normal range.

Operating rooms and intensive care units require sustained attention, rapid decision-making, and technical precision, even under routine conditions. Consequently, even modest increases in anxiety may affect clinical performance in these settings. The multivariable regression model (Table 7) identified the self-reported impact of the earthquake on job performance and the level of concern about future earthquakes as significant factors associated with state anxiety. However, the model explained only a limited proportion of the variance in state anxiety (adjusted  $R^2 = 0.101$ ), suggesting that other unmeasured individual, occupational, or environmental factors may also contribute to this variance. Because of the cross-sectional design, the direction of the association between job performance and state anxiety cannot be determined. The observed

association may reflect a bidirectional relationship between these two variables.

State anxiety was negatively associated with job performance. In contrast, no significant association was observed between state anxiety and perceived institutional support. Previous studies have suggested that organisational support may help reduce anxiety and burnout during crises (13-16). This pattern was not observed in the present study. The available data do not allow an explanation of this finding. Characteristics of the measurement instrument, features of the study population or other unmeasured factors may have contributed.

Although most participants reported psychological distress during the earthquake and widespread concern about future earthquakes, only two reported receiving formal psychological support. Whether this reflects limited access to services, institutional barriers, or reluctance to seek help cannot be determined from the present data. Nevertheless, the very low uptake of psychological support may be relevant when planning disaster preparedness programmes for healthcare personnel.

The job performance and perceived institutional support questionnaires used in this study were developed by the researchers to assess occupational and organisational aspects in the post-disaster setting. Item development was informed by previous studies on post-disaster occupational functioning and organisational support among healthcare workers (13-16). Both instruments demonstrated good internal consistency in the present sample, with Cronbach's alpha values of 0.846 and 0.852, respectively. However, a comprehensive psychometric evaluation, including factor analysis and assessment of construct validity, was beyond the scope of this study. Accordingly, these findings should be interpreted with caution. Future studies should include comprehensive psychometric validation of these researcher-developed questionnaires, including assessment of construct validity and factor structure, to support their future use in similar settings.

### Strengths

This study has several strengths. It focused on operating room and intensive care personnel, a group that has been underrepresented in post-disaster mental health research. The combined use of the DASS-21 and STAI-S allowed the assessment of both broader psychological symptoms and state anxiety. The inclusion of earthquake-related experience variables facilitated interpretation of the findings within the context of the disaster. Subgroup and multivariable regression analyses also provided a more detailed evaluation of factors associated with state anxiety.

### Study Limitations

This study has several limitations. First, the cross-sectional design does not allow assessment of temporal changes or causal relationships. Voluntary participation may have introduced selection bias. In addition, potentially relevant factors, including previous earthquake experience, coping style, perceived structural safety of the home environment, and perceived earthquake risk, were not evaluated. Because only state anxiety was assessed, no conclusions can be drawn regarding more stable anxiety characteristics. Although the job performance and perceived institutional support instruments demonstrated good internal consistency in this sample, a comprehensive psychometric evaluation, including factor analysis and assessment of construct validity, was not performed. The sample size was not determined a priori. However, post-hoc power analysis indicated adequate power for the primary correlation analysis (power > 0.99,  $\alpha = 0.05$ , observed  $p = 0.565$ ,  $n = 110$ ). Responses to the three open-ended questions in the questionnaire were not analysed in the present study. A separate qualitative analysis of these responses is planned.

### Conclusion

Clinically relevant depressive and anxiety symptoms were identified in a substantial proportion of operating room and intensive care personnel following the Silivri earthquake. Higher state anxiety was associated with poorer job performance, but was not significantly associated with perceived institutional support. Self-reported impact of the earthquake on job performance and concern about future earthquakes were identified as significant factors associated with state anxiety in the multivariable model. Despite widespread psychological distress, the use of formal psychological support was very limited. These findings suggest that disaster preparedness programmes for operating room and intensive care personnel may benefit from incorporating strategies that support psychological resilience.

### Ethics

**Ethics Committee Approval:** The study was conducted in accordance with the principles of the Declaration of Helsinki. Ethical approval was obtained from the University of Health Sciences Türkiye, Sancaktepe Şehit Prof. Dr. İlhan Varank Training and Research Hospital Ethics Committee on May 14, 2025 (decision number: 2025/157).

**Informed Consent:** Participation was voluntary, and written informed consent was obtained from all participants before data collection.

## Footnotes

### Authorship Contributions

Surgical and Medical Practices: H.E., H.K.K., Concept: H.E., H.K.K., Design: H.E., H.K.K., Data Collection or Processing: H.E., H.K.K., Analysis or Interpretation: H.E., H.K.K., Literature Search: H.E., H.K.K., Writing: H.E., H.K.K.

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

**Financial Disclosure:** The authors declared that this study received no financial support.

## References

1. Republic of Türkiye Ministry of Interior, Disaster and Emergency Management Presidency (AFAD). 06 February 2023 Pazarcık-Elbistan (Kahramanmaraş) Mw 7.7-Mw 7.6 earthquakes report. Ankara: AFAD; 2023. [\[Crossref\]](#)
2. Çifçi S, Kiliç Z. The disaster of the century: effects of the 6 February 2023 Kahramanmaraş earthquakes on the sleep and mental health of healthcare workers. *Int J Environ Res Public Health*. 2024;21:1533. [\[Crossref\]](#)
3. Li XY, Wang J, Zhang RX, Chen L, He CK, Wang CY, et al. Psychological status among anesthesiologists and operating room nurses during the outbreak period of COVID-19 in Wuhan, China. *Front Psychiatry*. 2020;11:574143. [\[Crossref\]](#)
4. Yağar F, Tunç A, Dökme Yağar S, Gerçek E. The effect of health workers' earthquake anxiety levels on perceived stress and work-family conflict: a study of the February 2023 Kahramanmaraş earthquake in Turkey. *Disaster Med Public Health Prep*. 2025;19:e87. [\[Crossref\]](#)
5. Parsons T. Recalculated probability of  $M \geq 7$  earthquakes beneath the Sea of Marmara, Turkey. *J Geophys Res Solid Earth*. 2004;109(B5):B05304. [\[Crossref\]](#)
6. Hergert T, Heidbach O. Slip-rate variability and distributed deformation in the Marmara Sea fault system. *Nat Geosci*. 2010;3(2):132-135. [\[Crossref\]](#)
7. Lovibond PF, Lovibond SH. The structure of negative emotional states: comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behav Res Ther*. 1995;33(3):335-343. [\[Crossref\]](#)
8. Spielberger CD, Gorsuch RL, Lushene RE. Manual for the State-Trait Anxiety Inventory. Palo Alto (CA): Consulting Psychologists Press; 1970. [\[Crossref\]](#)
9. Uddin H, Hasan MK, Cuartas-Alvarez T, Castro-Delgado R. Effects of mass casualty incidents on anxiety, depression, and post-traumatic stress disorder among doctors and nurses: a systematic review. *Public Health*. 2024;234:132-142. [\[Crossref\]](#)
10. Yıldırım GÖ, Sarı B. Experiences of operating room professionals during the 2020 Izmir Earthquake: a qualitative approach. *Disaster Med Public Health Prep*. 2023;17:e566. [\[Crossref\]](#)
11. Tüğen LE, Göksu M, Erdoğan AB. The level of anxiety in healthcare workers and their children during the COVID-19 pandemic. *Psychiatry Res*. 2023;326:115309. [\[Crossref\]](#)
12. Emiral E, Bulut YE, Öztürk-Emiral G, Sarıca-Çevik H, Aksungur A. Psychosocial status of healthcare workers during the COVID-19 pandemic. *Infect Dis Clin Microbiol*. 2023;5:300-310. [\[Crossref\]](#)
13. Sert H, Gulbahar Eren M, Koc F, Yurumez Y. Depression, anxiety, stress, and job performance among Turkish nurses in the early post-earthquake period. *Int Nurs Rev*. 2025;72:e12920. [\[Crossref\]](#)
14. Labrague LJ, De Los Santos JAA. COVID-19 anxiety among front-line nurses: predictive role of organisational support, personal resilience and social support. *J Nurs Manag*. 2020;28:1653-1661. [\[Crossref\]](#)
15. Reitz KM, Terhorst L, Smith CN, Campwala IK, Owoc MS, Downs-Canner SM, et al. Healthcare providers' perceived support from their organization is associated with lower burnout and anxiety amid the COVID-19 pandemic. *PLoS One*. 2021;16:e0259858. [\[Crossref\]](#)
16. Zhou T, Xu C, Wang C, Sha S, Wang Z, Zhou Y, et al. Burnout and well-being of healthcare workers in the post-pandemic period of COVID-19: a perspective from the job demands-resources model. *BMC Health Serv Res*. 2022;22:284. [\[Crossref\]](#)