# Comparison of Post-Traumatic Stress Disorder and Post-Traumatic Growth Status Between Healthcare Professionals Employed in Earthquake-Affected Areas and Non-employing Employees

## Deprem Bölgesinde Çalışan ve Çalışmayan Sağlık Çalışanlarının Travma Sonrası Stres Bozukluğu ve Travma Sonrası Büyüme Durumlarının Karşılaştırılması

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## ABSTRACT

**Objective:** This study aimed to compare the levels of Post-Traumatic Stress Disorder (PTSD) and post-traumatic growth among healthcare professionals working in earthquake-affected areas and those who do not work in such areas.

**Methods:** This descriptive and relational study was conducted in Giresun. The sample of the research consisted of 119 healthcare workers working in earthquake-affected areas and 134 healthcare workers who did not go to earthquake-affected areas. Data were collected using the Demographic Information Form, Post-Traumatic Stress Disorder Checklist (PCL-5), and Post-Traumatic Growth Inventory (PGI). The t-test for independent samples, Pearson correlation analysis, and multiple linear regression analysis were used for data analysis.

**Results:** There were statistically significant differences (p<0.05) in the total PCL-5 scores as well as in the re-experiencing, avoidance, negative alterations in cognition and mood, and hyper-arousal subscales between healthcare professionals working in earthquake-affected areas and those who did not work in such areas. However, no statistically significant differences were found in the total PGI scores, points of self-perception, philosophy of life, and changes in relationships (p>0.05). A moderate and positive correlation was found between participants' total PCL-5s and total PGI scores (r=0.370, p<0.05). In terms of predictors, the number of children (β=0.137, p=0.020) and total PCL-5 score (β=0.361, p=0.000) were identified as the most significant predictors of post-traumatic growth.

**Conclusion:** A significant relationship between PTSD and post-traumatic growth has been observed.

**Keywords:** Earthquake, trauma, post-traumatic growth, stress, healthcare professionals

## ÖZ

**Amaç:** Bu çalışmada, deprem bölgesinde çalışan ve çalışmayan sağlık çalışanlarında travma sonrası stres bozukluğu ve travma sonrası büyüme düzeylerinin karşılaştırılması amaçlanmıştır.

**Yöntem:** Tanımlayıcı ve ilişkisel tipteki bu çalışma Giresun ilinde yürütülmüştür. Araştırmanın örneklemini deprem bölgesinde çalışan 119 ve deprem bölgesine gitmeyen 134 sağlık çalışanı oluşturmuştur. Araştırmanın verileri Demografik Bilgi Formu, Travma Sonrası Stres Bozukluğu Kontrol Listesi (PCL-5) ve Travma Sonrası Büyüme Envanteri (PGI) ile toplanmıştır. Verilerin analizinde bağımsız gruplarda t-testi, Pearson korelasyon analizi, multipl lineer regresyon analizi kullanılmıştır.

**Bulgular:** Deprem bölgesinde çalışan ve çalışmayan sağlık çalışanlarının toplam PCL-5, yeniden yaşama, kaçınma, negatif değişiklikler ve aşırı uyarılma puan ortalamaları istatistiksel açıdan farklılık göstermiştir (p<0,05). Ancak, toplam PGI, benlik algısında, yaşam felsefesinde ve başkalarıyla ilişkilerde değişim puan ortalamalarında istatistiksel açıdan önemli bir fark saptanmamıştır (p>0,05). Katılımcıların toplam PCL-5 ile toplam PGI puan ortalamaları arasında orta düzeyde ve pozitif yönde bir ilişki bulunmuştur (r=0,370, p<0,05). Çocuk sayısı (β=0,137, p=0,020) ile toplam PCL-5 (β=0,361, p=0,000) travma sonrası büyümenin en önemli yordayıcıları olarak bulunmuştur.

**Sonuç:** Sonuç olarak, travma sonrası stres bozukluğu ile travma sonrası büyüme arasında önemli bir ilişki saptanmıştır. Deprem bölgesine giden ve gitmeyen sağlık çalışanlarının travma sonrası stres bozukluğu ve travma sonrası büyüme açısından desteklenmesi önerilmiştir.

**Anahtar Kelimeler:** Deprem, travma, post-travmatik büyüme, stres, sağlık çalışanları

## INTRODUCTION

An earthquake is a sudden and intense shaking of the Earth's surface caused by the movement of tectonic plates along a fault line in the Earth's crust. Between 1998 and 2017, earthquakes resulted in approximately 750,000 deaths worldwide, with over 125 million people affected during this period-being injured, left homeless, displaced, or evacuated during the emergency phase.[1] In Türkiye, on February 6, 2023, two earthquakes occurred in the Pazarck district of Kahramanmaraş, measuring 7.7 and 7.6 magnitudes with an epicenter near Elbistan. Following the earthquakes, 11,020 aftershocks were recorded. The earthquakes caused significant destruction in 11 cities, including Kahramanmaraş, Gaziantep, Şanlurfa, Diyarbakr, Adana, Adyaman, Osmaniye, Hatay, Kilis, Malatya, and Elazığ, resulting in the loss of 45,089 lives.[2] A total of 9,011 healthcare personnel were deployed in the disaster area. In the healthcare facilities of these cities, 144,156 healthcare professionals provided medical services to earthquake victims.[3]

In February 2023, a series of earthquakes in both Türkiye and Syria led to a level of psychological stress that was almost unimaginable for survivors. Being caught in earthquakes and sustaining injuries, witnessing their homes' severe damage or collapse, and seeing their cities were flat and evacuated have had a devastating impact on people.[4] The earthquakes have given rise to a high prevalence of Post-Traumatic Stress Disorder (PTSD). PTSD is defined in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5) as a psychiatric disorder that can emerge due to exposure to a traumatic event, either directly or indirectly through repeated exposure to such events.[5] Healthcare professionals witness distressing events like earthquakes, facing lifeless bodies and providing care to those emerging from the rubble. This exposure makes them vulnerable to mental health issues.[6] A study indicated that 87.3% of healthcare professionals experienced a traumatic event during an earthquake.[7] Such traumatic experiences during disasters have led to stress, anxiety, and PTSD among healthcare workers.[8] A study conducted shortly after the Malatya-Elazığ earthquake found that approximately a quarter of healthcare workers had

experienced severe trauma.[9] Post-traumatic growth is emphasized so that healthcare professionals can receive support regarding the trauma they have experienced and gain meaning from the trauma experience.

However, the concept of post-traumatic growth should also be mentioned. Post-traumatic growth refers to a transformation that occurs after trauma and is characterized by approaching life with gratitude, discovering new personal strength, and focusing on helping others.[10] It signifies a positive psychological change experienced by an individual after a traumatic event. This change is expressed through enhanced self-awareness, improved relationships, the development of new goals and priorities, and a heightened sense of spiritual well-being.[11] Therefore, in the aftermath of significant disasters such as earthquakes, individuals can heal, find new meaning in life, and contribute positively to their personal development.

The aim of this study was to compare the levels of PTSD and post-traumatic growth between healthcare professionals working in earthquake-affected areas and those not working in such areas. The hypotheses of this study are as follows:

1. The prevalence of PTSD is higher among healthcare professionals working in earthquake-affected areas than among those not working in such areas.

2. The levels of post-traumatic growth among healthcare professionals working in earthquake-affected areas are higher than those not working in such areas.

3. A relationship exists between PTSD and post-traumatic growth levels among healthcare workers.

## METHODS

### Study Population and Sample

The research was conducted in Giresun. As a comparative study, the sample of the research consists of case and control groups. The case group includes healthcare workers who were assigned to the earthquake-affected area in Giresun city, whereas the control group consists of healthcare workers who did not go to the earthquake-affected area. The aim was to include physicians, nurses, midwives, nursing assistants, paramedics, and other

healthcare workers who had served in the earthquake-affected area.

Inclusion criteria for participation in the study were as follows: being 18 years and older, having worked in the earthquake-affected area, having returned from the earthquake-affected area, volunteering to participate in the research, and completing the data collection forms comprehensively. The exclusion criterion was a desire to withdraw from the study and a psychiatric disorder. No patient was excluded from the study, but only 253 of 500 healthcare professionals answered the survey.

## Sample Size

Sample size calculation was performed using the Raosoft sample size calculator (http://www.raosoft.com/samplesize.html), resulting in a sample size of 129-166 for the case group with a 5% margin of error, 80% response rate, and 90-95% confidence interval. The goal was to reach 129-166 individuals in both the case and control groups. Ultimately, 119 individuals in the case group and 134 individuals in the control group volunteered to participate and completed the Google Forms.

## Data Collection

The research data were collected using a demographic information form, Post-Traumatic Stress Disorder Checklist (PCL-5), and Post-traumatic Growth Inventory (PGI). Contact information for healthcare workers who had been to the earthquake-affected area was obtained from the Provincial Health Directorate. The prepared Google Forms was sent to them via email. Similarly, the phone numbers of healthcare workers who would be in the control group were obtained, and a Google Forms was sent to them as well. It took approximately 15-20 min to complete the forms and scales.

## Instruments

The Demographic Information Form was developed by the researchers and consists of 18 questions that assess various information including age, gender, family type, marital status, number of children, occupation, education level, years in the profession, psychological first aid and first aid training history, and previous experience of disasters.

**PCL-5:** This scale was developed by Weathers et al.[12] and its Turkish validity and reliability were established by Boysan et al.[13] PCL-5 consists of four scales corresponding to PTSD symptom clusters in DSM-5: re-experiencing, avoidance, negative alterations, and hyper-arousal. The scale is 20 items long and is scored on a 5-point Likert scale ranging from 0 to 4. Possible scores on the scale range from 0 to 80. As scores on the scale increase, the severity of trauma also increases.

**PGI:** This scale was developed by Kağan et al.[14] It consists of three dimensions: changes in self-perception, changes in the philosophy of life, and changes in relationships. The 6-point Likert scale comprises 21 items. The Cronbach's alpha value for the entire scale is 0.92, for changes in self-perception is 0.88, for changes in philosophy of life is 0.78, and for changes in relationships is 0.77.

## Ethical Consideration

Ethical approval from the Clinical Research Ethics Committee of Giresun Training and Research Hospital was obtained to conduct the study (date: 27.03.2023, decision no: KAEK-65/03). Written consent was obtained from all participants. Every stage of the research was conducted in line with the principles of the Declaration of Helsinki.

## Statistical Analysis

The data were analyzed using the Statistical Package for the Social Sciences 24.0 software package. Descriptive statistics included counts, percentages, means, and standard deviations. The normal distribution of the data was assessed using the Kolmogorov-Smirnov test, and it was found that the scale score averages exhibited a normal distribution. The categorical variables were analyzed using the chi-square test. A t-test was employed to compare the scale scores between the case and control groups in independent groups. To determine predictors of PTSD and post-traumatic growth levels, multiple linear regression analysis was used. The relationship between the two scales was analyzed using Pearson's correlation test. A significance level of $p < 0.05$ was considered for all analyses.

In the post hoc analysis, considering the PCL-5 mean scores, the effect size of the sample was calculated as 0.56 using the G*Power 3.1.9.7 program. Considering the total PGI score averages, the effect size was found to be 0.21. 0.56 is considered medium effect size and 0.21 is considered low effect size.[15]

## RESULTS

As shown in Table 1, demographic characteristics such as age, marital status, family structure, education level, and previous earthquake experience did not exhibit a statistically significant difference between healthcare workers who went to the earthquake-affected area and those who did not ($p > 0.05$). However, gender, number of children, occupation, years of service, receiving psychological first aid training in disasters, and receiving first aid training in disasters showed statistically significant differences ($p < 0.05$).

As shown in Table 2, there were statistically significant differences ($p < 0.05$) in the total PCL-5 scores as well as the re-experiencing, avoidance, negative alterations,

| Table 1. Demographic characteristics of the participants | | | | |
|---|---|---|---|---|
| **Demographic characteristics** | **Healthcare professionals working in the earthquake zone (n=119)** | **Healthcare professionals not working in the earthquake zone (n=134)** | **χ² value** | **p value** |
| | n (%) | n (%) | | |
| **Gender** | | | | |
| Female | 57 (47.9) | 97 (72.4) | 15.869 | 0.000* |
| Male | 62 (52.1) | 37 (27.6) | | |
| **Marital status** | | | | |
| Single | 52 (43.7) | 64 (47.8) | 0.419 | 0.517 |
| Married | 67 (56.3) | 70 (52.2) | | |
| **Number of children** | | | | |
| Having no child | 66 (55.9) | 74 (55.2) | 7.881 | 0.049** |
| 1 | 9 (7.6) | 25 (18.7) | | |
| 2 | 36 (30.5) | 30 (22.4) | | |
| ≥3 | 7 (5.9) | 5 (3.7) | | |
| **Family structure** | | | | |
| Nuclear | 97 (81.5) | 117 (87.3) | 3.023 | 0.221 |
| Extended | 16 (13.4) | 15 (11.2) | | |
| Broken | 6 (5.0) | 2 (1.5) | | |
| **Occupation** | | | | |
| Nurse | 42 (35.3) | 70 (52.2) | 44.139 | 0.000* |
| Doctor | 14 (11.8) | 31 (23.1) | | |
| ATT | 30 (25.2) | 0 (0.0) | | |
| Midwife | 5 (4.2) | 9 (6.7) | | |
| Other | 28 (23.5) | 24 (17.9) | | |
| **Educational status** | | | | |
| High school | 7 (5.9) | 6 (4.5) | 4.409 | 0.221 |
| Associate degree | 29 (24.4) | 20 (14.9) | | |
| Bachelor's degree | 61 (51.3) | 83 (61.9) | | |
| Postgraduate/doctoral graduate | 22 (18.5) | 25 (18.7) | | |
| **Working year** | | | | |
| 1-5 | 42 (35.3) | 67 (50.0) | 13.653 | 0.008** |
| 6-10 | 18 (15.1) | 14 (10.4) | | |
| 11-15 | 17 (14.3) | 21 (15.7) | | |
| 16-20 | 23 (19.3) | 8 (6.0) | | |
| ≥21 | 19 (16.0) | 24 (17.9) | | |
| **Psychological first aid education in disasters** | | | | |
| Yes | 21 (17.6) | 11 (8.2) | 5.082 | 0.024** |
| No | 98 (82.4) | 123 (91.8) | | |
| **First aid education in disasters** | | | | |
| Yes | 70 (58.8) | 38 (28.4) | 23.911 | 0.000* |
| No | 49 (41.2) | 96 (71.6) | | |
| **Prior disaster experience** | | | | |
| Yes | 41 (34.5) | 32 (23.9) | 3.432 | 0.064 |
| No | 78 (65.5) | 102 (76.1) | | |
| Age (x±SD) | 34.13±7.93 | 32.96±8.65 | 1.117 | 0.265 |
| *p<0.01; **p<0.05. SD: Standard deviation | | | | |

and hyper-arousal subscale scores between healthcare professionals who worked in the earthquake-affected area and those who did not. However, there were no statistically significant differences (p>0.05) in the total PTGI scores and the scores for changes in self-perception, philosophy of life, and relationships between the two groups.

Table 3 provides the average scale scores of the participants. There was a moderate and positive correlation (r=0.370, p<0.05) found between participants' total PCL-5s and total PTGI scores. A moderate and positive correlation was observed between total PTGI scores and the re-experiencing (r=0.330), negative alterations (r=0.311), and hyper-arousal (r=0.404) subscale scores, whereas a weak and positive correlation was found between total PTGI scores and the avoidance subscale (r=0.297, p<0.05). In Table 4, Model 1 explains 17% of the variance in post-traumatic growth. Among the subscales of PCL-5, only hyperarousal was identified as a significant predictor of post-traumatic growth (β=3.911, p=0.000). Model 2, which includes psychological first aid training and first aid training in disasters along with previous disaster

experience, explains 6% of the variance in post-traumatic growth and is not statistically significant (p=0.703). Model 3 explains 7% of the variance in post-traumatic growth. Among the sociodemographic variables, gender (β=-0.162, p=0.012) and the number of children (β=0.261, p=0.012) is identified as significant predictors of post-traumatic growth. In Model 4, the variables found to be significant in previous models are included. Model 4 explains 15% of the variance in post-traumatic growth. The number of children (β=0.137, p=0.020) and total PCL-5 score (β=0.361, p=0.000) is identified as the most important predictors of post-traumatic growth.

## DISCUSSION

In our study, there was a difference in PTSD scores between healthcare professionals who visited the earthquake-affected area and those who did not. Specifically, healthcare professionals who worked in the earthquake area had lower PCL-5 scores than those who didnot. A systematic review and meta-analysis found a PTSD prevalence of 16.4% among

### Table 2. Comparison of the scale averages of the participants

| Scale and subscales | Healthcare professionals working in the earthquake zone (n=119) | Healthcare professionals not working in the earthquake zone (n=134) | Test value | p value |
|---|---|---|---|---|
| | $\overline{x}\pm SD$ | $\overline{x}\pm SD$ | | |
| Total PCL-5 | 29.56±17.08 | 38.76±15.98 | -4.426 | 0.000* |
| Re-experiencing | 7.50±4.25 | 10.12±4.18 | -4.932 | 0.000* |
| Avoidance | 2.92±1.96 | 3.91±1.83 | -4.160 | 0.000* |
| Negative alterations | 10.38±6.33 | 13.94±5.92 | -4.608 | 0.000* |
| Hyper-arousal | 8.74±5.75 | 10.78±5.53 | -2.868 | 0.004** |
| Total PGI | 52.52±23.92 | 47.76±21.79 | 1.656 | 0.099 |
| Changes in self perception | 27.36±12.61 | 24.82±10.83 | 1.718 | 0.087 |
| Changes in philosophy of life | 13.90±7.22 | 12.82±6.44 | 1.256 | 0.210 |
| Changes in relationship | 11.26±5.91 | 10.11±5.88 | 1.546 | 0.123 |

*p<0.01; **p<0.05.
PCL-5: Post-Traumatic Stress Disorder Checklist, PGI: Post-traumatic Growth Inventory, SD: Standard deviation

### Table 3. Correlation between the PGI and PCL-5

| | Total PGI | Changes in self perception | Changes in philosophy of life | Changes in relationship |
|---|---|---|---|---|
| Total PCL-5 | 0.370* | 0.324* | 0.426* | 0.296* |
| Re-experiencing | 0.330* | 0.288* | 0.372* | 0.275* |
| Avoidance | 0.297* | 0.269* | 0.345* | 0.217* |
| Negative alterations | 0.311* | 0.278* | 0.366* | 0.231* |
| Hyper-arousal | 0.404* | 0.346* | 0.461* | 0.342* |

*p<0.05.
PCL-5: Post-Traumatic Stress Disorder Checklist, PGI: Post-traumatic Growth Inventory

healthcare professionals due to earthquakes.[5] In a study conducted in Türkiye, severe trauma was found in 25.8% of healthcare workers.[8] A study involving emergency medical technicians in Taiwan revealed that 12.7% experienced PTSD symptoms.[16] In Türkiye, the PTSD rate among ambulance workers was found to be 16.9%.[17] A study conducted in the general population found this rate to be 18.9%.[18] In a study involving elderly survivors of an earthquake in China, this rate was notably higher at 40.5%.[19]

Overall, disasters have a negative impact on healthcare professionals. However, no comparative study has been conducted on PTSD between healthcare workers working and not working in disaster areas. In this study, it was found that those who did not go to the earthquake-affected area had higher post-traumatic stress levels. There could be various reasons for this difference, one of which is secondary trauma. Secondary trauma does not necessarily involve direct exposure to the traumatic event. It arises from witnessing or being exposed to the traumatic experiences of others.[20] Helplessness and the inability to cope with the witnessed event can negatively affect various individuals. The extent of this impact cannot be precisely estimated because of factors such as cultural differences, the persistence of trauma, and the meaning attributed to the event, all of which can influence the severity of trauma.[21] Following the February 6 earthquake, millions of people were exposed to secondary trauma through social media and television. Therefore, the level of PTSD among healthcare professionals who did not go to the earthquake-affected area should be studied in different samples to gain a more comprehensive understanding.

In this study, the post-traumatic growth scores of healthcare professionals who visited the earthquake-affected area were found to be higher than those who didnot, but this difference was not statistically significant (p>0.05). Post-traumatic growth refers to experiences such as increased coping skills, positive developments in interpersonal relationships, increased self-esteem, positive thinking, and adaptation to trauma following a traumatic event.[21] The lack of significant difference in post-traumatic growth among healthcare professionals who visited the earthquake-affected area could be because growth requires time to occur. This is because individuals develop post-traumatic growth by constructing new and positive life narratives and re-evaluating their traumatic experiences. Growth emerges not from the event itself but from how the event is processed. It guides individuals to recognize their vulnerabilities, what they can and

**Table 4. Predictors of post-traumatic growth**

| Model | Variables | B | SE | β | t | p | R | R² |
|---|---|---|---|---|---|---|---|---|
| Model 1: Post-traumatic stress disorder symptoms | Re-experiencing | 0.279 | 0.608 | 0.054 | 0.459 | 0.646 | 0.408 | 0.166 |
| | Avoidance | 0.399 | 1.227 | 0.034 | 0.326 | 0.745 | | |
| | Negative alterations | -0.424 | 0.452 | -0.118 | -0.939 | 0.349 | | |
| | Hyper-arousal | 1.736 | 0.444 | 0.433 | 3.911 | 0.000* | | |
| Model 2: Disaster experience | Psychological first aid education in disasters | 2.429 | 4.764 | 0.035 | 0.510 | 0.611 | 0.075 | 0.006 |
| | First aid education in disasters | -3.782 | 3.202 | -0.082 | -1.181 | 0.239 | | |
| | Prior disaster experience | 0.880 | 3.226 | 0.017 | 0.273 | 0.785 | | |
| Model 3: Demographic characteristics | Age | -0.402 | 0.432 | -0.145 | -0.930 | 0.353 | 0.259 | 0.067 |
| | Gender | -7.577 | 2.995 | -0.162 | -2.530 | 0.012** | | |
| | Marital status | -2.345 | 3.706 | -0.051 | -0.633 | 0.527 | | |
| | Number of sibling | 6.054 | 2.399 | 0.261 | 2.524 | 0.012** | | |
| | Family structure | 3.544 | 3.170 | 0.072 | 1.118 | 0.265 | | |
| | Profession | 0.361 | 0.968 | 0.025 | 0.373 | 0.710 | | |
| | Educational status | -1.893 | 2.026 | -0.063 | -0.934 | 0.351 | | |
| | Working year | -0.067 | 2.353 | -0.004 | -0.028 | 0.977 | | |
| Model 4: Predictors of PTG | Gender | -1.197 | 2.924 | -0.026 | -0.409 | 0.683 | 0.390 | 0.152 |
| | Number of sibling | 3.168 | 1.358 | 0.137 | 2.332 | 0.020** | | |
| | Total PCL-5 | 0.484 | 0.084 | 0.361 | 5.760 | 0.000* | | |

Model 1 (F=12.359, p=0.000); Model 2 (F=0.470, p=0.703); Model 3 (F=2.186, p=0.029); Model 4 (F=14.830, p=0.000);*p<0.01; **p<0.05.

PTG: Post-traumatic growth, PCL-5: Post-Traumatic Stress Disorder Checklist

cannot control, and compels them to reevaluate their personal priorities.[22] It can be argued that the process of making sense of these experiences requires time, thus suggesting the need for a longer-term perspective. Therefore, it may be advisable to repeat these studies in the future to better capture the potential trajectories of post-traumatic growth.

A limited number of studies have investigated the relationship between earthquakes, trauma, and post-traumatic growth among healthcare professionals. A study conducted in Japan found that the levels of post-traumatic growth among disaster medical assistance team members working during earthquakes were associated with psychological resilience.[23] In a study of nurses in Iran's Kermanshah city after an earthquake, cognitive reappraisal and cognitive flexibility were identified as the most significant predictors of post-traumatic growth.[24] In Türkiye, during the pandemic, it was determined that coping styles and social support among healthcare professionals supported post-traumatic growth.[25] In a study with nurses in Türkiye, marital status and coping styles were identified as two significant factors predicting post-traumatic growth levels during the COVID-19 pandemic.[26] Similarly, a study related to the pandemic found that the post-traumatic growth levels of healthcare professionals working in COVID-19 clinics were associated with their levels of hope.[27] Therefore, it can be said that there are many factors that influence post-traumatic growth. To better understand post-traumatic growth among healthcare workers in disasters, phenomenological studies should be conducted to contribute to a deeper understanding of the subject.

In this study, a moderate and positive relationship was found between PTSD and post-traumatic growth. Regression analysis revealed that post-traumatic growth was the most significant predictor of PTSD. A study involving nurses, doctors, and medical students caring for patients with patients found a significant but weak relationship between PTSD and post-traumatic growth.[28] An investigation of adolescents who survived an earthquake and tsunami revealed that despite experiencing significant losses and suffering, they attempted to interpret the trauma caused by the disaster as a starting point for making changes and finding meaning in life.[29] A study observed that out of five nurses working in Gaza, one nurse experienced symptoms of post-traumatic stress two years after an attack on Gaza, and various post-traumatic growth responses developed following exposure to trauma. Furthermore, a significant relationship between traumatic events and post-traumatic growth has been identified.[30] Conversely, a study involving Chinese rescue workers did not find a relationship between PTSD and post-traumatic growth.[31] In general,

post-traumatic growth is associated with PTSD. However, for post-traumatic growth to occur, an individual needs to comprehend the trauma experienced, which often requires time and support.

Finally, in this study, gender and number of children were identified as the two most significant predictors of post-traumatic growth after the level of PTSD. A study evaluating the effects of COVID-19 and quarantine found that women exhibited higher levels of post-traumatic growth than men.[22] Similarly, another study conducted during the COVID-19 pandemic found a significant relationship between gender and post-traumatic growth although this relationship was of a weak nature.[26] In another study, no relationship was found between healthcare workers' levels of post-traumatic growth and their gender, but a relationship was found with marital status.[28] An investigation involving frontline nurses during the COVID-19 pandemic found a relationship between post-traumatic growth and the number of children, whereas no relationship was observed with variables such as gender, age, education level, marital status, profession, or years of work.[32] As is evident, predictors of post-traumatic growth vary across studies. Conducting further research on earthquake-related cases could contribute to a deeper and comparative understanding of this phenomenon.

### Study Limitations

This study has some limitations. The study was conducted only in the Giresun province. Therefore, the study results are valid only for this sample. In this study, follow-up was not performed. By conducting a prospective cohort study, participants' long-term post-traumatic stress and post-traumatic growth levels could be evaluated.

### CONCLUSION

In this study, the trauma levels of healthcare workers going to earthquake-stricken areas were found to be lower than those who did not go. However, the levels of post-traumatic growth did not differ significantly between the two groups. There was a significant relationship between healthcare workers' levels of post-traumatic stress and post-traumatic growth. In addition, the most significant predictors of post-traumatic growth were gender, having children, and symptoms of PTSD.

In line with these results, it is important to monitor healthcare professionals who have been to earthquake-stricken areas and those who have not in terms of post-traumatic stress symptoms and provide the necessary psychosocial support. Psychosocial interventions targeting post-traumatic growth should be planned and implemented by healthcare professionals. In the future, similar studies should be conducted with larger samples,

and phenomenological studies focusing on post-traumatic growth should be planned.

## Ethics

**Ethics Committee Approval:** Ethical approval from the Clinical Research Ethics Committee of Giresun Training and Research Hospital was obtained to conduct the study (date: 27.03.2023, decision no: KAEK-65/03).

**Informed Consent:** Written consent was obtained from all participants.

**Peer-review:** Externally and internally peer-reviewed.

## Authorship Contributions

Concept: A.B., E.B.Y., Design: A.B., E.B.Y., A.A., Data Collection or Processing: A.B., A.A., Analysis or Interpretation: E.B.Y., Literature Search: A.B., E.B.Y., A.A., Writing: A.B., E.B.Y.

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