Research Article / Araştırma Makalesi

The Relationship Between Post-Earthquake Anxiety Status with Sleep Problems, Low Back and Neck Pain in Victims of the Kahramanmaraş-Centred Earthquakes

Kahramanmaraş Merkezli Depremler Sonrası Depremzedelerin Anksiyete Durumunun Uyku Problemleri, Bel ve Boyun Ağrısı ile İlişkisi

Demet GÖZAÇAN KARABULUT [1], Hatice YILDIRIM [1], Gönül ELPEZE [1], Çağtay MADEN [1]

[1]Gaziantep Islam Science and Technology University, Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Gaziantep, TÜRKİYE

Abstract

Background: This study aims to examine the relationship between post-earthquake anxiety status with sleep problems, low back and neck pain in victims of the Kahramanmaraş-centered earthquakes.
Materials and Methods: The present study included 291 victims of the Kahramanmaraş-centered earthquakes between the ages of 18-65 years. The study individuals were evaluated with the Beck Anxiety Inventory (BAI), the Oswestry Disability Index (ODI), the Neck Disability Index (NDI), and the Pittsburgh Sleep Quality Index (PSQI).
Results: Of the individuals, 67% experienced mild, moderate, and severe anxiety, and all individuals had poor sleep quality (6.9±3.8). While 57% of the individuals sheltered in their own homes had the mean PSQI score of 5 and above, 75% of those sheltered outside their homes had such a score. The ODI score percentage was above 20% in 27% of the individuals sheltered in their own homes and in 37% of those sheltered outside their own homes. A statistically moderate correlation was determined between the BAI score and the ODI score, the NDI score, and the PSQI score (r=0.511, r=0.604, r=0.539, respectively).
Conclusions: Post-earthquake anxiety was revealed to be associated with sleep problems and low back and neck pain. Considering the relationship between anxiety, sleep problems, and low back and neck pain in the support approaches to be adopted for earthquake victims, approaches involving these parameters should be planned.

Key Words: Anxiety, Earthquake, Low back pain, Neck pain, Sleep disorders

Öz

Amaç: Bu çalışmanın amacı, Kahramanmaraş merkezli depremler sonrası depremzedelerin anksiyete durumunun uyku problemleri, bel ve boyun ağrısı ile ilişkisini incelemektir.
Materyal ve Metod: Çalışmaya Kahramanmaraş merkezli depremleri yaşayan, 18-65 yaş arası 291 birey dahil edildi. Çalışmaya dahil edilen bireyler Beck Anksiyete Ölçeği (BAÖ), Oswestry Engellilik Anketi (OEA), Boyun Özürlülük Sorgulama Anketi (BÖSA), Pittsburgh Uyku Kalite İndeksi (PUKİ) ile değerlendirildi.
Bulgular: Katılımcıların %67'sinin hafif, orta ve ağır düzeyde anksiyetesinin olduğu, tamamında ise uyku kalitesinin kötü olduğu bulundu (6.9±3.8). Katılımcılardan kendi evinde barınanların %57'sinin Pittsburgh Uyku Kalite İndeksi skor ortalama değerleri 5 ve üzeri iken, kendi evi dışında barınanlarda bu oran %75'di. Kendi evinde barınanların %27'si, kendi evi dışında barınanların %37'si, OEA skor yüzdeleri %20 üstü olan bireylerdi. BAÖ skoru ile OEA skoru, BÖSA skoru ve PUKİ skoru arasında istatistiksel olarak orta düzeyde ilişki olduğu bulundu (sırasıyla r=0.511, r=0.604, r=0.539).
Sonuç: Deprem sonrası anksiyetenin, uyku problemleri, bel ve boyun ağrısı ile ilişkili olduğu bulundu. Depremzedelere uygulanacak olan destek yaklaşımlarında, anksiyete varlığı, uyku problemleri, bel ve boyun ağrısı arasındaki ilişki göz önünde bulundurarak, bu parametreleri kapsayıcı yaklaşımların planlanması gerektiği ifade edilebilir.

Anahtar Kelimeler: Anksiyete, Bel Ağrısı, Boyun Ağrısı, Deprem, Uyku problemi

Corresponding Author / Sorumlu Yazar

Dr. Demet GÖZAÇAN KARABULUT
Gaziantep Islam Science and Technology University, Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation,
27010 Gaziantep, TÜRKİYE.

E-mail: dg.karabulut@gmail.com

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Introduction

Earthquakes are natural disasters that cause shaking on the ground surface. They account for 8% of natural disasters worldwide. Earthquakes rank third among natural disasters, following storms and floods, in terms of the destructive effect and economic loss they cause (1). Numerous adverse effects, such as partial or complete destruction of buildings, fires, spillage of hazardous chemicals, airway obstruction caused by dust and rubble, dehydration, and hypo- and hyperthermia, occur during earthquakes (2). Economic losses, destruction, and loss of life associated with these negative factors may result in problems such as fear, hopelessness, anxiety, and post-traumatic stress disorder in survivors (3-5). Considering the mental health status of individuals after earthquakes, an increased incidence of anxiety and depression has been reported (6-8).

It has also been stated that natural disasters such as earthquakes, which are a major source of stress, are closely associated with sleep problems (9). It is known that sleep problems such as insomnia, shortened sleep time, nightmares, restlessness during sleep, and daytime sleepiness are frequently observed after major earthquakes (10). It is remarkable that fewer studies on anxiety, depression, and stress after earthquakes have examined sleep disorders (8,11). On the other hand, a study investigating sleep problems after the East Japan earthquake also drew attention to the relationship between sleep disorders and low back pain (12).

Low back and neck pain are common health problems in the general population. There are temporary or permanent forms with different factors defined in the short and long terms (13). Low back and neck pain are reported as the most common musculoskeletal system problems in individuals living in areas affected by earthquakes (14-16). The study conducted after the 2011 earthquake in Japan reported a relationship between low back and neck pain after the earthquake (16).

Two earthquakes, first with a magnitude of 7.7 centered in Kahramanmaraş (Pazarcık) at 04:17 Turkish time and second with a magnitude of 7.6 centered in Kahramanmaraş (Elbistan) at 13:24, occurred on February 6, 2023. The epicenter of the first earthquake was located at 37.288 °N, 37.043 °E and lied at a depth of 8.6 km. The epicenter of the second earthquake was located at 38.089 °N, 37.239 °E and lied at a depth of 7 km. These earthquakes were felt in a broad area, affecting 11 provinces, including Kahramanmaraş, Hatay, Gaziantep, Osmaniye, Malatya, Adana, Diyarbakır, Şanlıurfa, Adıyaman, Elazığ, and Kilis. According to the official figures, 50,783 people lost their lives, and 115,353 people were injured in these earthquakes. Moreover, 37,984 buildings were destroyed (17). Based on these data, the present study aims to investigate the relationship between anxiety status and sleep problems, low back and neck pain in victims of the Kahramanmaraş-centered earthquakes. To the best of our knowledge, the relationship between anxiety and sleep problems, and low back and neck pain in earthquake victims has not been examined. It is thought that investigating the relationship between these factors may reveal a dynamic relationship between them and guide the social support approaches to be adopted for earthquake victims.

Materials and Methods

The study included two hundred ninety-one individuals between the ages of 18-65 who experienced the Kahramanmaraş-centered earthquakes (Adana, Adıyaman, Diyarbakır, Elazığ, Gaziantep, Hatay, Kahramanmaraş, Kilis, Malatya, Osmaniye, and Şanlıurfa) and continued to live in the above-mentioned 11 provinces. Individuals who voluntarily agreed to participate in the study were enrolled in the study. Individuals with severe mental or physical disorders that would prevent their understanding of the questions and individuals who were illiterate in Turkish were excluded from the study. The data were collected via an online survey between July and September 2023. The researchers shared the online questionnaire form on social media platforms (such as WhatsApp, Instagram, and Facebook), and the respondents were requested to share it with other people who experienced the earthquake. At the beginning of the online questionnaire sent to the individuals, they expressed whether they wanted to participate in the study or not. Thus, their consent was obtained.

The online form used in our study questioned individuals' sociodemographic information, such as gender, age, height, weight, educational status, occupation, economic status, place of residence, chronic diseases, restriction due to pain, and the province where they experienced the earthquake. The participants' anxiety status was evaluated with the Beck Anxiety Inventory. The low back pain impact was evaluated with the Oswestry Disability Index. The neck pain impact was assessed with the Neck Disability Index, and sleep disorders were evaluated with the Pittsburgh Sleep Quality Index.

For the study, approval dated 16/06/2023 and numbered 268.26.24 was obtained from the Non-Interventional Research Ethics Committee of Gaziantep Islam Science and Technology University. This study was carried out in accordance with the principles of the Declaration of Helsinki. In our study, the minimum number of subjects required for a significant difference between the two independent variables was calculated in the program G*Power and found as 153 (a=0.05, test power: 0.80, effect size 1.26) (18).

Beck Anxiety Inventory (BAI)

This scale consists of 21 questions evaluating the frequency of anxiety symptoms and the individual's mood. The Likert-type scoring ranges between 0 (Not at all) to 3 (Severely-It bothered me a lot) points. The lowest score that can be obtained from the scale is 0, and the highest score is 63. A high total score indicates a high level of anxiety. The total scores are classified as minimum anxiety (0-7 points), mild anxiety

(8-15 points), moderate anxiety (16-25 points), and severe anxiety (26-63 points) (19). The Turkish validity and reliability studies of the inventory were performed (20).

Pittsburgh Sleep Quality Index (PSQI)

This index, which quantitatively evaluates sleep quality and sleep disturbance, contains 24 questions. The nineteen questions of the PSQI are answered by the individual, and five questions are answered by the person living with the individual. The last five questions are not included in the scoring. The nineteen questions answered by the individual comprise seven components, including subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleep medication, and daytime dysfunction. These components are scored in the range of 0-3, and the total score is obtained between 0-21. A total score higher than 5 indicates "poor sleep quality" (21). Ağargün et al. performed the Turkish validity and reliability study of the PSQI (22).

Oswestry Disability Index (ODI)

This scale was used to evaluate how much low back pain in the individuals affected their daily activities. It is one of the frequently used criteria to assess low back pain in individuals. It has 10 sections designed to assess restrictions in various activities of daily living. Each section is scored between 0 and 5 within itself. The questionnaire score of the individual is divided by the highest score that can be obtained from the questionnaire and expressed in percentage.

The percentage values obtained are interpreted as follows: low back pain does not pose a significant problem in the patient's life (0-20%), slightly restricts his/her daily life (20-40%), severely restricts his/her daily life (40-60%), completely restricts daily life (60-80%), and the patient is bedridden (80-100%) (23). Yakut et al. performed its Turkish validity and reliability study (24).

Neck Disability Index (NDI)

The questionnaire developed to assess how neck pain affects activities of daily living consists of 10 items. Four items are related to personal findings, and six items are related to activities of daily living. Each item is scored between 0 and 5 within itself. The total score gives the index score. The results are classified as no disability (0-4), mild disability (5-14), moderate disability (15-24), severe disability (25-34), and full disability (35 and above) (25). The Turkish validity and reliability studies of the index were conducted (26).

Statistical Analysis

Statistical analysis was carried out using the SPSS 25 (Version 25, Chicago, USA) package program. The compliance of the data with normal distribution was analyzed analytically by the Shapiro-Wilk test. Descriptive statistics were expressed as arithmetic mean and standard deviation (X ± SD) for numerical variables. The correlation between the two variables was analyzed with Pearson's correlation test. Pearson correlation coefficients were used to assess the relationships of anxiety and with each test, and were classified as low (0.26 – 0.49), moderate (0.5– 0.69), high (0.7–0.89), or very high (0.9 –1.0) (27). The level of significance in the statistical solutions used in the study was considered as p=0.01 for correlation analysis. Linear regressions were used when more than one predictor was available that could explain the pattern of a dependent variable.

Results

This study included two hundred ninety-one victims of the Kahramanmaraş-centered earthquakes with a mean age of 27.9±9.1 years. Table 1 contains the individuals' demographic characteristics, anxiety status, sleep problems, and low back and neck pain information.

Table 1. The participants' demographic characteristics, anxiety status, sleep problems, low back and neck pain

	X±SD (%) (n=291)
Gender (F/M)	222/69 (76-23%)
Age (years)	27.9±9.1
Height (cm)	165.5±16.2
Weight (kg)	65.5±13.9
Education status	
Primary school (n)	13 (4.5%)
Secondary school (n)	2 (0.7%)
High school (n)	28 (9.6%)
University (n)	215 (73.9%)
Post-graduate (n)	33 (11.3%)
Economic status	
Income less than expenditure (n)	99 (34%)
Income equals expenditure (n)	136 (46.7%)
Income more than expenditure (n)	56 (19.2%)
Place of residence	
Container (n)	5 (1.7%)
Own home (n)	268 (92.1%)
Relative's house (n)	8 (2.7%)
Dormitory/hotel/shelter (n)	9 (3.1%)
Beck Anxiety Inventory	17.6±14.2
Minimum Anxiety (n)	92 (32%)
Mild anxiety (n)	50 (17%)
Moderate anxiety (n)	72 (25%)
Severe anxiety (n)	77 (26%)
Pittsburgh Sleep Quality Index	6.9±3.8
Oswestry Disability Index	14.7±14.3
0-20% (n)	204 (70%)
20-40% (n)	68 (23%)
40-60% (n)	19 (7%)
Neck Disability Index	7.3±6.5
No disability (n)	114 (39%)
Mild disability (n)	137 (47%)
Moderate disability (n)	36 (13%)
Severe Disability (n)	4 (1%)

While 44% of the individuals sheltered in their own homes had a BAI score above moderate (16>), 52% of those sheltered outside their own homes (container, relative's house, dormitory/hotel/shelter) had a BAI score above moderate. Whereas 57% of the individuals sheltered in their own

homes had the mean PSQI score of 5 and above, 75% of those sheltered outside their own homes had such a score. The ODI score percentage was above 20% in 27% of the individuals sheltered in their own homes and in 37% of those sheltered outside their own homes. While 11% of those sheltered in their own homes had an NDI score of 15 and above, 16.6% of those sheltered outside their homes had the above-mentioned score.

Table 2 shows the relationship between the BAI, ODI score percentage, NDI score, and PSQI scores. A moderate positive correlation was identified between the BAI anxiety score and ODI score, NDI score, and PSQI score (r=0.511, r= 0.604, r=0.539, respectively, Table 2). Simple linear regression showed that, PSQI, NDI and ODI were independent statistically significant predictors of BAI (see Table 3).

Table 2. Association of anxiety with sleep problems, low back and neck pain

		Beck Anxiety Inventory	Pittsburgh Sleep Quality Index	Oswestry Disability Index	Neck Disability Index
Beck Anxiety Inventory	r	-	0.539	0.511	0.604
	p	-	0.000*	0.000*	0.000*
Pittsburgh Sleep Quality Index	r		-	0.463	0.535
	p		-	0.000*	0.000*
Oswestry Disability Index	r			-	0.694
	p			-	0..000*

**p<0.001, Pearson's correlation test*

Table 3. Linear regression with Beck Anxiety Inventory as a dependent variable

Independent variable	**Simple Linear Regression**			
	B	**SE**	**t**	**p**
Constant	2.759	1.373	2.009	0.046
Pittsburgh Sleep Quality Index	1.019	0.206	4.939	<0.001
Neck Disability Index	,784	,149	5,254	<0.001
Oswestry Disability Index	,291	,132	2,199	0,029
R= 0.664	F= 65.564			
R^2= 0.441	P= 0.00			

Discussion

This study investigated the correlation between post-earthquake anxiety status and sleep problems, low back and neck pain in victims of the Kahramanmaraş-centered earthquakes that occurred on February 6, 2023. The study results indicated a correlation between anxiety status and sleep problems, low back and neck pain in earthquake victims.

Numerous losses of life, property, and houses were experienced after the high-magnitude earthquakes on February 6, 2023. It is known that the incidence of psychological problems and anxiety increases after earthquakes of this and similar magnitudes, resulting in great losses (6,7). It is stated that individuals who have experienced earthquakes display higher post-traumatic stress symptoms compared to those who have experienced other natural disasters (28). This actually indicates the magnitude of the negative impact of earthquakes on people among natural disasters. This study determined that 25% of the earthquake victims had a moderate level of anxiety and 26% had a severe anxiety after the Kahramanmaraş-centered earthquakes, which affected 11 provinces and many people traumatically. This shows that individuals' levels of anxiety after the earthquake were high, in parallel with previous studies.

It is stated that post-earthquake mental problems such as anxiety and stress disorders are a determining factor in sleep quality (11). It is known that insomnia, depression, and anxiety symptoms occur at high rates during the early post-earthquake periods (29). It is reported that the incidence of insomnia is significantly higher 4 and 18 months after a large-scale earthquake. On the other hand, it is emphasized that individuals who have insomnia problems in the long term are also more likely to experience psychological problems (29). Likewise, the correlation between post-earthquake stress, resilience, and sleep problems is reported, and it is stated that sleep-targeted interventions should be implemented in approaches for post-traumatic stress disorders (30). Similarly, our study determined that the mean PSQI total scores of victims of the Kahramanmaraş-centered earthquakes indicated poor sleep quality. These findings support the idea that the sleep quality of individuals has been adversely affected during the post-earthquake period. Considering that post-earthquake sleep problems are an important factor in emerging anxiety and stress symptoms, it can be said that social support approaches to be adopted for earthquake victims should focus on sleep problems. However, individuals who work with earthquake victims can be informed that they should recognize sleep disorders and manage these issues in intervention programs. Based on our study, where data were collected 5 months after the earthquake, it can be investigated what long-term effects have been observed and

whether they continue.

After large-scale natural disasters, the physical and mental effects of disasters are intensively observed in individuals living in the affected area (29). Among the physical effects observed after earthquakes, low back and neck pain is the most common musculoskeletal problem (14-16). It is also stressed that musculoskeletal pain in other parts of the body of individuals who have experienced the earthquake before the earthquake is associated with low back pain that begins after the earthquake (16). A prospective study examining the 2- and 3-year long-term effects of an earthquake stated that the economic difficulties experienced by earthquake victims and neck pain were correlated and observed at high rates (17). Different studies also draw attention to the correlation between low back pain and sleep disorders (12,31). The mean percentage values obtained for the ODI showed that the low back pain of earthquake victims did not pose a significant problem in their lives. However, the mean total scores of the NDI indicated that neck pain caused mild disability in the daily lives of earthquake victims. These findings show that the incidence of low back and neck pain in earthquake victims is high, and low back pain leads to restriction in daily life, although not significant, whereas neck pain causes mild restriction.

Considering the anxiety status of the study individuals as individuals sheltered in their own homes and individuals sheltered in a different place other than their own homes, it was revealed that individuals sheltered outside their own homes had scores above the moderate level, and they had poorer sleep quality at higher rates. This indicates that individuals sheltered in a different place other than their own homes during the post-earthquake period experience anxiety and sleep problems more than individuals sheltered in their own homes. We can suggest that this issue should be investigated more comprehensively by ensuring equality between groups in future research since the proportions of individuals staying in their own homes and individuals staying in a different place other than their own homes differed in our study.

It is remarkable that depression, anxiety, and post-traumatic stress disorder are frequently investigated in earthquake victims and the correlation between these issues and sleep problems is studied (11,29,30). However, the correlation between anxiety and sleep problems, and low back and neck pain has not been researched. Investigating the correlation between these factors is one of this study's strengths. The fact that victims of the Kahramanmaraş-centered earthquakes that affected 11 provinces were mostly individuals in certain provinces and the distribution by provinces was not similar is among this study's limitations. Collecting the study data 5 months after the earthquake may have affected the findings differently. It is another limitation of our study that the distribution of individuals living in their own homes, containers, relatives' houses, and dormitory/hotel/shelters was not similar. It is recommended that the regions where earthquakes occur and the areas where individuals live be distributed homogeneously in future research. Moreover, there is a need for studies investigating the long-term effects of earthquakes on anxiety, sleep problems, low back and neck pain in earthquake victims.

In conclusion, it was elucidated that post-earthquake anxiety was associated with sleep problems, low back and neck pain in earthquake victims. This study showed that the physical health of earthquake victims was also adversely affected, in addition to problems affecting their mental well-being, such as anxiety problems and sleep disorders. In light of these results, it can be asserted that, in holistic support approaches to be adopted for earthquake victims, the relationship between anxiety, sleep problems, and low back and neck pain should be considered, and approaches including these parameters should be planned.

Ethical Approval: For the study, approval dated 16/06/2023 and numbered 268.26.24 was obtained from the Non-Interventional Research Ethics Committee of Gaziantep Islam Science and Technology University.

Author Contributions:
Concept: D.G.K., H.Y., Ç.M., G.E.
Literature Review: D.G.K., H.Y., Ç.M., G.E.
Design : D.G.K., H.Y., Ç.M., G.E.
Data acquisition: D.G.K., H.Y., Ç.M., G.E.
Analysis and interpretation: D.G.K., H.Y., Ç.M., G.E.
Writing manuscript: D.G.K., H.Y., Ç.M., G.E.
Critical revision of manuscript: D.G.K., H.Y., Ç.M.

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