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The Impact of Patients' Pain Level on the Anxiety Levels of Themselves and Their Attendants

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ABSTRACT

Objective: Pain is a major obstacle for people to perform their daily duties and a condition deteriorating the quality of life. The present study aimed to investigate the effects of pain on anxiety levels. **Materials and Methods:** The study included patients who had thoracic trauma or thoracic surgery between January 01, 2023, and July 01, 2023, and their relatives who stayed with them as primary attendants. Demographic data from all volunteers included in the study were collected, and a visual analog scale (VAS) was administered to trauma patients on the first day after trauma and to surgical patients on postoperative day 1. The Beck Anxiety Inventory (BAI) was administered to both patients and their attendants, and anxiety scores were determined. The anxiety levels were categorized as mild, moderate, and severe anxiety. **Results:** A total of 174 patients and 174 primary attendants were enrolled in the study. The mean VAS scores of the patients were 6.06 for males and 6.56 for females. A statistically significant relationship was observed between the VAS and BAI scores of the patients. There was also a significant relationship between the patients and their attendants regarding BAI scores. **Conclusion:** Pain in patients can cause anxiety, although not severe, for both patients and their caregivers. **Keywords:** Anxiety, Pain, Trauma, Malignancy.

Hastalarının Ağrı Düzeylerinin, Kendileri ve Refakatçilerinin Anksiyete Düzeylerine Etkisi

ÖZ

Amaç: Ağrı, insanların günlük görevlerini yerine getirmelerinin önünde büyük bir engel ve yaşam kalitelerini bozan bir durumdur. Ağrının kaygı düzeyleri üzerindeki etkilerini ortaya koymayı amaçladık. **Gereç ve Yöntem:** Çalışmaya 01.01.2023-01.07.2023 tarihleri arasında göğüs travması veya göğüs cerrahisi geçiren hastalar ve yanında kalan yakınları birincil refakatçi olarak dahil edildi. Çalışmaya dahil edilen tüm gönüllülerden demografik veriler toplandı ve travma sonrası ilk gün travma hastalarına ve ameliyat sonrası 1. gün cerrahi hastalara görsel analog skala (VAS) uygulandı. Hem hastalara hem de refakatçilerine Beck Anksiyete Envanteri (BAÖ) uygulandı ve anksiyete puanları belirlendi. Kaygı düzeylerini hafif, orta, şiddetli kaygı olarak sınıflandırdık. **Bulgular:** Çalışmaya toplam 174 hasta ve 174 primer refakatçi dahil edildi. Hastaların VAS skor ortalamaları erkeklerde 6.06, kadınlarda 6.56 idi. Hastaların VAS ile BAÖ skorları arasında anlamlı bir ilişki olduğu gözlemlendi. Hastalar ile yakınları arasında da BAÖ skorları açısından anlamlı bir ilişki mevcuttu. **Sonuç:** Hastalarda ağrı hem hastalar hem de bakım verenler için şiddetli olmasa da anksiyeteye neden olabilir. **Anahtar Kelimeler:** Anksiyete, Ağrı, Travma, Malignite.

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INTRODUCTION

Being healthy is defined as being in a state of complete physical, social, and mental well-being. Diseases affect people negatively biologically, psychologically, and socially (Gök & Hergül, 2020; Kutlu et al., 2016; Oflaz & Vural, 2010). Nevertheless, surgical treatment methods are procedures that negatively affect the well-being of patients (Batista dos Santos et al., 2014; Oral et al., 2022). Surgical procedures cause deterioration in well-being, particularly by causing an increase in anxiety levels in patients. Hospitalization, uncertainty in the post-procedure period, post-procedure pain, and the surgeon's attitude play a critical role in patients' anxiety levels about the procedure (Gök & Hergül, 2020; Oral et al., 2022). The resulting anxiety negatively affects the patient's recovery process, causes prolonged hospitalization, and even leads to the development of morbidity and mortality with psychological disorders after discharge (Basak et al., 2015; Gök & Hergül, 2020; Kutlu et al., 2016; Shoar et al., 2016).

The present study, in accordance with the literature, aimed to evaluate the pain levels of patients who were hospitalized in our clinic for trauma or surgical treatment and the anxiety levels of the patients and their relatives who stayed with them as attendants.

MATERIALS AND METHODS

Patients over the age of 18 who had chest trauma or underwent a thoracic surgery operation between January 01, 2023, and July 01, 2023, and their primary attendants were included in the study. Patients with previously known psychiatric disorders before hospitalization, patients using an anxiolytic treatment for various reasons, patients who could not use the analgesic treatment protocol we applied routinely or patients who were treated outside of routine protocol were excluded from the study. Moreover, when a patient or a relative of the patient did not want to participate in the study, those were not included as well. Our team collected demographic information of all volunteers included in the study, and asked trauma patients on the first day after trauma and surgery patients on the first postoperative day to classify the pain on a visual analog scale (VAS). The VAS score ranged from "0" as "no pain" to "10" as "extremely severe pain."

There is an analgesia protocol routinely used in our clinic. Accordingly, if there is no contraindication, patients are administered 50 mg diclofenac sodium twice a day and 500 mg paracetamol three times a day. Furthermore, 100 mg tramadol is administered to patients twice a day in the first 24 hours.

Subsequently, patients and their attendants were administered the Beck Anxiety Inventory (BAI), an inventory introduced by Beck in 1988 to reveal the anxiety levels of individuals, which determined their anxiety scores. (Beck et al., 1988). In this scale,

there are 21 items, each of which is scored between 0 and 3 points. BAI was applied to all patients and their relatives by a surgeon working in the clinic in an interviewer-administered manner. The total score calculated by summing these items determines the anxiety levels, and according to the BAI, it is categorized as "no anxiety" for scores 0-8, "mild anxiety" for 8-15 points, "moderate anxiety" for 16-25 points, and "severe anxiety" for 25-63 points. Patients were categorized according to the surgical methods and trauma, and evaluated statistically according to the diagnosis, procedure, pain scores, and anxiety levels of the patients and their attendants.

Statistical analysis

SPSS (Statistical Package for the Social Sciences Version 22.0; SPSS Inc. Chicago, IL, USA) program statistically analyzed the data. Numbers (n) and percentages (%) presented the categorical data. Shapiro-Wilk test measured the normality distribution assumption of continuous data. Mean \pm standard deviation (SD) values demonstrated the normally distributed continuous data and median (25-75th percentiles) values presented the data without normal distribution. The relationship between continuous and categorical (dichotomous) variables was determined by Independent Samples t-test and Mann Whitney-U test according to appropriateness. The relationships between continuous and more than two categorical variables were examined by the one-way ANOVA test and Kruskal-Wallis test, as appropriate. When significance was observed in the one-way ANOVA test, Tukey and Games-Howel tests were applied in post hoc pairwise group comparisons in accordance with variance homogeneity. The relationships between continuous data were analyzed by Spearman correlation analysis. A partial correlation test was applied to suppress multicollinearity in the relationships between continuous data. The statistical significance was considered for p-values below 0.05. This study was performed following the approval of the Izmir Katip Çelebi University Non-Interventional Clinical Research Ethics Committee with the decision number 583 in 2022.

RESULTS

A total of 174 patients (120 males (69%) and 54 females (31%)) and 174 primary attendants (50 males (28.7%) and 124 females (71.3%)) were included in our study. Descriptive data of 174 patients and 174 attendants of the study are summarized (Table 1).

The mean VAS scores of the patients were 6.06 ± 2.09 for males and 6.56 ± 1.92 for females. The analysis of the factors affecting the VAS score of the patients is presented (Table 2).

Table 1. The descriptive statistics of the study population.

		N (%)
Patients' Age (years)		52.31±18.53*
Patients' Gender	Male	120 (69.0%)
	Female	54 (31.0%)
Patients' Educational Status	No Formal Education	6 (3.4%)
	Primary School Graduate	57 (32.8%)
	Middle School Graduate	38 (21.8%)
	High School Graduate	59 (33.9%)
	University Graduate	14 (8.0%)
Patients' Employment Status	Unemployed	122 (70.1%)
	Employed	52 (29.9%)
Attendants' Age (/year)		48.14±12.36*
Attendants' Gender	Male	50 (28.7%)
	Female	124 (71.3%)
Attendants' Educational Status	No Formal Education	4 (2.3%)
	Primary School Graduate	43 (24.7%)
	Middle School Graduate	46 (26.4%)
	High School Graduate	59 (33.9%)
	University Graduate	22 (12.6%)
Attendants' Employment Status	Unemployed	114 (65.5%)
	Employed	60 (34.5%)
Hospitalization Reason	Non-Traumatic Etiology	40 (23.0%)
	Malignancy	45 (25.9%)
	Trauma	89 (51.1%)
Treatment	Medical treatment	63 (36.2%)
	Surgical operation	86 (49.4%)
	Tube Thoracostomy	25 (14.4%)
VAS Score		6.21±2.05*
Patients' BAI Score		6.0 (3.0-10.0)**
Patients' BAI Level	No anxiety	109 (62.6%)
	Mild anxiety	46 (26.4%)
	Moderate anxiety	15 (8.6%)
	Severe anxiety	4 (2.3%)
Attendants' BAI Score		3.0 (0.0-6.0)**
Attendants' BAI Level	No anxiety	140 (80.5%)
	Mild anxiety	21 (12.1%)
	Moderate anxiety	7 (4.0%)
	Severe anxiety	6 (3.4%)

*Mean±SD; **Median (25th- 75th percentile); BAI: Beck Anxiety Inventory; VAS: Visual Analogue Scale.

Table 2. The distribution and difference analysis of VAS scores according to various parameters.

		VAS score Mean±SD	p
Patient's Gender	Male	6.06±2.09	0.140*
	Female	6.56±1.92	
Patient's Educational Status	No Formal Education	7.00±2.37	0.877**
	Primary School Graduate	6.22±1.89	
	Middle School Graduate	6.13±2.18	
	High School Graduate	6.24±2.16	
	University Graduate	5.93±1.90	
Patient's Employment Status	Unemployed	6.17±2.13	0.691*
	Employed	6.31±1.87	
Hospitalization Reason	Non-Traumatic Etiology	6.80±1.81	0.034** 1-2(0.028)
	Malignancy	5.64±2.52	
	Trauma	6.24±1.83	
Treatment	Medical treatment	6.18±1.81	0.401**
	Surgical operation	6.09±2.29	
	Tube Thoracostomy	6.72±1.70	

*Independent Samples t-Test; **One-way ANOVA test; VAS: Visual Analogue Scale.

In the distribution of VAS scores according to gender, educational status, employment status, and treatment options, no statistically significant difference was observed. The causes of hospitalization statistically significantly differed regarding VAS score distribution. According to the post-hoc pairwise group comparison, statistically significantly higher VAS scores were determined in patients hospitalized for non-traumatic etiology than in patients hospitalized for malignant diseases. According to the

correlation analysis for the relationship between VAS score and age, no statistically significant correlation was determined ($r:-0.113$; $p:0.138$).

While evaluating the relationship between VAS scores and BAI scores in patients and their attendants, we observed a statistically significant correlation between VAS scores and BAI scores in patients, and a less statistically significant correlation between BAI scores in attendants in the same direction. (Table 3, Figure 1).

Table 3. The correlation between VAS scores and BAI scores.

	VAS scores	
	r	p
BAI score in patients	0.322	0.001
BAI score in attendants	0.172	0.023

BAI: Beck Anxiety Inventory; **VAS:** Visual Analogue Scale; **r:** Spearman correlation coefficient.

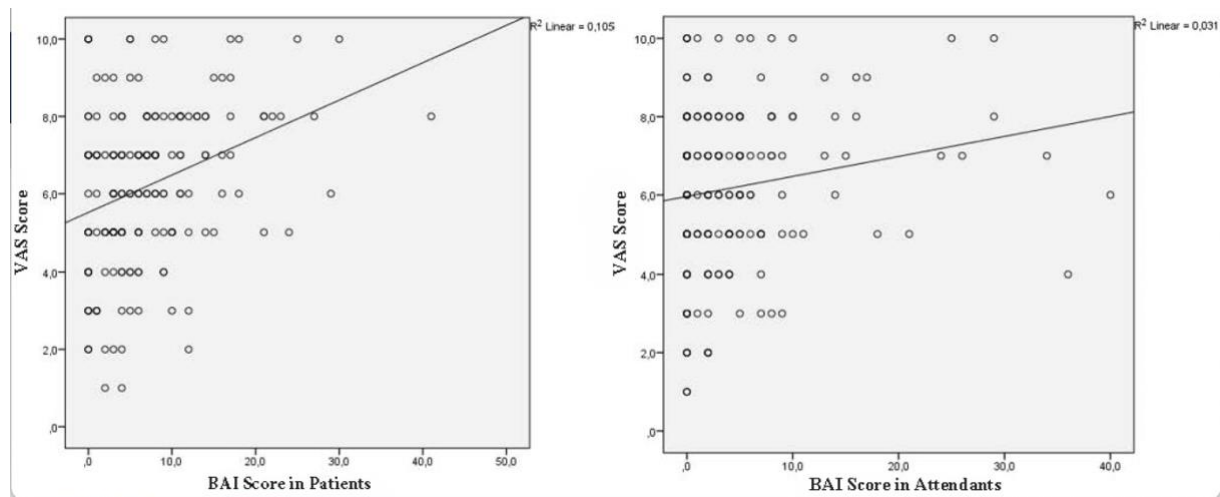


Figure 1: The distribution between VAS scores and BAI scores.

A statistically significant correlation was also determined between the BAI scores of the patients and their attendants ($r:0.514$; $p:0.001$). The likely reason for the less statistically significant correlation between VAS scores and BAI scores in companions was the distribution of BAI scores in patients. According to the partial correlation analysis, when the BAI scores of the patients were excluded, a statistically significant correlation was not observed between the VAS scores of the companions and the BAI scores of the companions ($r: 0.008$; $p: 0.918$).

Patients and attendants groups according to the BAI scores and the distribution of VAS scores between the groups is presented in Table 4. Accordingly, there was no statistically significant difference between BAI levels in the participants regarding the distribution of VAS scores. A significant difference was detected in the distribution of VAS scores between BAI levels in patients. According to post-hoc pairwise analyses, VAS scores were significantly higher in patients with moderate anxiety than in patients without anxiety.

Table 4. The distribution of VAS scores in patients and attendants according to the level of BAI.

		VAS score Mean ± SD	p
BAI level in patients	No anxiety	5.79±2.08	0.001* 1-3(0.001)
	Mild anxiety	6.52±1.76	
	Moderate anxiety	7.87±1.64	
	Severe anxiety	8.00±1.63	
BAI level in attendants	No anxiety	6.01±2.04	0.050*
	Mild anxiety	6.91±1.92	
	Moderate anxiety	7.57±1.99	
	Severe anxiety	7.00±2.00	

*One-way ANOVA test; BAI: Beck Anxiety Inventory; VAS: Visual Analogue Scale

BAI scores of patients and their attendants were evaluated according to various parameters. The patients and their attendants were evaluated multivariately in terms of age, gender, education level, employment status, the reason for hospitalization, and treatment parameters. According to this, no statistically significant difference was observed between the groups regarding the distribution of BAI scores among the parameters.

DISCUSSION

Pain is a multifaceted, discrepant, and individualized condition that may lead to long-term anxiety and depression in patients. Pain itself and the emotional states it causes frequently lead to hospital admissions (Ahmed et al., 2013; Garbi Mde et al., 2014; Kosson et al., 2018). In the present study, it was aimed to investigate the relationship between pain and anxiety in patients with traumatic or surgical pain. Although the majority of the patients who participated in our study did not have anxiety, it was observed that the level of anxiety and pain status were related in patients with anxiety. Another study demonstrated no relationship between labor pain and anxiety in their study of pregnant patients (Mete et al., 2016). Unlike our study, they used a state-trait anxiety inventory to determine the level of anxiety. Dutucu et al. (2022) also revealed a mild correlation between pain experienced during mammography and state-trait anxiety scores. Ulusoy et al. (2015) determined a significant correlation between pain and dissociative symptoms and depression in their study of patients with chronic migraine, and although there was a proportional increase in anxiety, the difference was not statistically significant. However, a similar study showed that pain that could not be treated effectively even one year after surgery negatively affected anxiety and increased the level of anxiety (Geng et al., 2022).

There was no statistically significant difference in the anxiety levels of the patients regarding gender, education level, employment status, and pain in this study. Ulusoy et al. (Ulusoy et al., 2015) also observed no significant correlation between sociodemographic data and patients' dissociative

symptoms and anxiety in their study. Another study demonstrated that anxiety and depression levels in patients increased as the level of education increased. They also reported that the level of anxiety was higher in the non-working population, but there was no statistically significant difference (Gök & Hergül, 2020).

Oral et al. (Oral et al., 2022) reported that the level of pain and anxiety in patients hospitalized in surgical clinics disrupted the sleep patterns of the patients. In addition, studies have indicated that disrupted sleep patterns lead to an increase in postoperative pain and anxiety levels (Çam Yanık & Altun Uğraş, 2020).

In their study, Yazıcı et al. (2003) evaluated the localization of pain and the duration of pain, as well as the quality of life and anxiety of the people. In their studies, it was revealed that patients' pain localization, gender, and age characteristics affected their quality of life. On the other hand, it was demonstrated that gender and age were significantly effective on anxiety, and education did not affect them. However, when the depression scores were examined, the level of education was significant. The quality of life was determined to be deteriorated significantly in patient groups with high anxiety and depression scores.

A study in the literature compared people with chronic physical disabilities and healthy people in terms of pain, anxiety, and depression, and determined that there were significantly higher rates in people with chronic physical disabilities in the scales they applied. In subgroup studies, it was demonstrated that pain was significantly associated with anxiety and depression in healthy individuals. They also revealed that anxiety and depression significantly affected the quality of life. It has also been reported that there is a significant relationship between age, pain, anxiety, and depression in people with chronic physical disabilities (Tarsuslu et al., 2010).

Demir et al. (2010) applied an anxiety scale to patients who underwent cardiac surgery. They did not detect a significant difference in anxiety in terms of age, gender, marital status, income level, occupation,

and place of birth in patients whose anxiety levels were measured with the state-trait anxiety inventory (STAI), which is accepted as the gold standard before surgery. However, a significant decrease was observed in anxiety scores after the information in the patients. It is very natural for patients who would undergo major surgery regardless of pain to develop anxiety, and in these cases, informing the patient in advance about all the physiological effects related to surgery that may be experienced is the situation that reduces anticipatory anxiety the most.

Köksal & Aslan, (2017), approached the relationship between pain and anxiety from a different perspective in their study. They evaluated the pain status of patients diagnosed with major depressive and anxiety disorders. While there was no significant relationship between age, gender, working status, and pain symptoms in patients diagnosed with major depressive disorder, it has been observed that working status significantly increases pain symptoms in patients with anxiety disorders. In both groups of patients, the severity of pain increased significantly as the score increased in the depression and anxiety scales applied. In both groups, pain symptoms were less as the level of education increased. This study also indicates that in the case of underlying anxiety or depression, the perception of pain is higher. In other words, there is a mutual positive correlation between pain and the patient's anxiety and depression.

Elbi (2017) mentioned biopsychosocial factors in the perception of pain in her review article. It was reported that many factors affected the perception of pain: family, work, culture, and environmental factors as social factors; personal characteristics and known psychiatric disorders as psychological factors; and the location of the lesion, the severity, location and duration of the pain as biological factor. They stated that pain, which does not have a concrete indicator, was expressed by the patient with various verbal and behavioral reactions, and that apathy and excessive interest affected pain behavior. It was also indicated that the patient's environmental factors as well as medical personnel were effective in this perception.

The present study aimed to determine how the pain and anxiety levels of the patients and the anxiety levels of their attendants were affected and to reveal the effect of the anxiety levels of the attendants on the patients. In our study, it was demonstrated that the pain level of the patients affected the anxiety levels of the attendants, but the correlation level was low. A statistically significant relationship could not be detected in anxiety levels between patients and their attendants.

Limitations

The greatest limitation of the study was that it was a study performed in an isolated patient group and on a voluntary basis. Thus, we could not evaluate all the factors that could create anxiety.

CONCLUSION

In conclusion, pain, which is the most common symptom before or after treatment in surgical clinics, significantly affected the anxiety level of patients. In addition, it had a negative impact on the anxiety level of patients' attendants. Anxiety leads to an emotional state that negatively impacts the healing process of patients. Therefore, effective analgesic treatment can accelerate the healing process by reducing anxiety in patients and their relatives.

Conflict of interest

The authors declare that they have no conflicts of interest regarding the study.

Author Contributions

Plan, design: MK, ÖK; **Material, methods and data collection:** MK, ZS, ÖK, BÇS, MÜ; **Data analysis and comments:** MK, ACY; **Writing and corrections:** MK, ACY, AA, EB.

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Ethical Approval

Institution: İzmir Katip Çelebi University Ethics Committee

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Approval no: 0583

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