



Contents lists available at ScienceDirect

## Journal of PeriAnesthesia Nursing

journal homepage: [www.jopan.org](http://www.jopan.org)

## Research

## The Relationship Between Emotional Intelligence and Fear of Pain in Patients Undergoing Elective Surgery



Semra Eyi, PhD, MSN, BSN, RN<sup>a,\*</sup>, Seher Ünver, PhD, MSN, BSN, RN<sup>b</sup>,  
Meltem Yıldırım, PhD, MSN, BSN, RN<sup>c</sup>, İlkyay Çulha, PhD, MSN, BSN, RN<sup>d</sup>

<sup>a</sup> Eskişehir Osmangazi University, Faculty of Health Sciences, Department of Surgical Nursing, Eskişehir, Türkiye

<sup>b</sup> Trakya University, Faculty of Health Sciences, Department of Surgical Nursing, Edirne, Türkiye

<sup>c</sup> Research group on Methodology, Methods, Models and Outcomes of Health and Social Sciences (M3O). Faculty of Health Sciences and Welfare. Centre for Health and Social Care Research (CESS). University of Vic-Central University of Catalonia (UVic-UCC). Institute for Research and Innovation in Life Sciences and Health in Central Catalonia (IRIS-CC), Vic, Spain

<sup>d</sup> Bilecik Şeyh Edebali University, Faculty of Health Sciences, Department of Surgical Nursing, Bilecik, Türkiye

## A B S T R A C T

## Keywords:

Emotional intelligence  
pain  
fear  
elective surgical procedures

**Purpose:** This study aimed to investigate the effect of emotional intelligence levels on the fear of pain for patients undergoing surgical intervention.

**Design:** This descriptive and cross-sectional study consisted of 254 patients.

**Methods:** Data were collected using the Personal Characteristics Information Form, Modified Schutte Emotional Intelligence Scale, Fear of Pain Questionnaire-III, and Numerical Pain Form. A correlational analysis was performed.

**Findings:** The mean age of patients was  $47.33 \pm 17.70$  years, and 57.9% (n = 147) were female. More than half of the patients (n = 174) were experiencing a certain degree of preoperative pain. A positive and statistically significant correlation was observed between the mean scores of the Fear of Pain Questionnaire-III and the Emotional Intelligence Scale. Female patients had significantly more fear of pain and higher scores in the Fear of Pain Questionnaire-III (optimism/mood regulation, utilization of emotions) and the Emotional Intelligence Scale.

**Conclusions:** The patients who manage "optimism/mood regulation" and have increasing levels of Emotional Intelligence could have a relatively higher fear of experiencing severe pain in the preoperative period. Despite the fear of experiencing severe pain, the patients tried to turn this negative situation into a positive one, as the dimensions of their emotional intelligence that provide and manage optimism/mood regulation were at a high level. The increasing level of Emotional Intelligence and "appraisal of emotions" might result in a decrease in the levels of fear of "minor pain" and "medical pain".

© 2024 American Society of PeriAnesthesia Nurses. Published by Elsevier Inc. All rights reserved.

The study aimed to investigate the effect of emotional intelligence levels on fear of pain and pain experiences in patients who will undergo surgical intervention. Furthermore, in light of the results of this study, it was also aimed to draw attention to the point that the emotional intelligence levels of the patients can also be addressed during the preoperative process. Therefore, we believe the research will add a new dimension to further studies and the surgical preparation processes of the patients.

## Background

According to the International Association for the Study of Pain, pain is defined as an unpleasant sensory and emotional experience associated with, or similar to, actual or potential tissue damage.<sup>1</sup> That the experience of pain has a strong emotional component is clear.<sup>2</sup> Neurobiological data show an interaction between pain and emotions.<sup>3–5</sup> Over the past few years, a number of studies have confirmed the critical role of psychological factors in the experience of pain.<sup>3,4,6</sup> With exposure to the stimulus that causes pain, the subcortical defense circuit interacts with the cerebral cortex causing the conscious experience of fear and anxiety, as well as the fear of pain, where the individual starts being afraid of the possibility of experiencing pain.<sup>5</sup> Therefore, sustained activation of the cortical

Funding: None to Report.

\* Address correspondence to: Semra Eyi, Eskişehir Osmangazi University, Faculty of Health Sciences, Department of Surgical Nursing, Odunpazarı, Eskişehir, Türkiye.

E-mail addresses: [semra.eyi@ogu.edu.tr](mailto:semra.eyi@ogu.edu.tr), [semra\\_il@yahoo.com](mailto:semra_il@yahoo.com) (S. Eyi).

<https://doi.org/10.1016/j.jopan.2023.08.004>

1089-9472/© 2024 American Society of PeriAnesthesia Nurses. Published by Elsevier Inc. All rights reserved.



Figure 1. Research framework.<sup>24</sup>

region of the brain by the deregulated subcortical defense circuit can cause secondary emotional reactions associated with pain, which in turn leads to higher pain.<sup>5,7,8</sup> It has been reported that positive mood induction decreases pain, whereas negative mood induction increases pain intensity and pain tolerance.<sup>2,9</sup> This leads to the development of pain-related fear, increased attention to pain, activity limitations, functional disability, and being trapped in a vicious cycle of constant and increasing fear and dysfunctional avoidance. As a result, the individual's quality of life diminishes, leading to the experience of long-term pain-related disability.<sup>10–12</sup> Individual differences in emotional regulation interfere with this relationship, and the individual's level of emotional intelligence is effective at this stage.<sup>3</sup>

Emotional intelligence is the act of using and displaying emotions through perception, control, and evaluation.<sup>13</sup> Emotional intelligence has been associated with lower pain intensity, less pain catastrophizing,<sup>14</sup> and lower pain scores in patients with pain.<sup>15</sup> It is a part of personality and is a type of intelligence that can be developed throughout life and is affected by many personal factors such as family and environment, age and education level, gender, and values. People who use their emotional intelligence can lead more effective and more fulfilling lives.<sup>5,16</sup> On the other hand, psychological factors such as people who cannot control their emotions and catastrophizing have been defined as typical responses to pain and are associated with individuals' nonadherence to some pain treatments.<sup>5,16,17</sup> Emotional intelligence as a set of adaptive emotional abilities has been found to facilitate stress resilience and predict higher levels of positive emotions.<sup>18</sup> In this context, emotional intelligence can reduce the frequency and intensity of pain by enhancing positive emotions and increasing cognitive flexibility, which can lead to the experience of lower pain intensity and ultimately better quality of life. Thus, emotional intelligence may also protect individuals from increased pain intensity.<sup>12,18</sup>

A correlation exists between emotional intelligence and pain. A study of the relationship between emotional intelligence and pain control found a strong correlation between high levels of emotional intelligence and low levels of pain.<sup>19</sup> However, a strong association has been found between emotional intelligence and centralized patient care.<sup>20</sup> Ruiz-Aranda et al, found that individuals with high emotional intelligence levels and who rated themselves as more capable of "emotional repair" experience less pain than those who reported lower skills.<sup>21</sup> The studies supporting that individuals with high emotional intelligence experience less pain and that management of one's emotions is related to pain management and pain experience have brought up the examination of emotional

intelligence and subfactors of emotional intelligence in pain management.<sup>22,23</sup> In addition, nurses or physicians often ignore the emotional state of patients while dealing with the patients' physical problems, and care is deprived of emotional intelligence. This situation results in nurses or physicians ignoring that the patients' emotional conditions can play an essential role in the healing process of the disease. Emotional intelligence positively affects mental health, well-being, and life satisfaction.<sup>17</sup> An examination of the emotional intelligence levels of individuals is an important factor in helping the individual to overcome the psychological effects of pain. Increasing awareness of the individual on the subject and preventing physio-pathological complications that may develop against pain in the organism when it continues for a long time is important. Studies have reported that pain management is inadequate during the perioperative period, and 50% to 80% of patients experience pain. Poor pain management leads to complications, delays the patient's recovery, prolongs the hospital stay, and increases costs.<sup>16,17</sup> When the literature is examined, we found no studies examining the relationship between fear of pain management which has an important place in the psychological preparation of patients who will undergo surgical intervention, and emotional intelligence levels.

## Study Design and Methods

### Research Framework

This cross sectional, descriptive research seeks to test the relationship between emotional intelligence and fear of pain among surgical patients undergoing surgical intervention and look for the relationships between some variables with fear of pain (Figure 1).<sup>24</sup> The independent variables for this study were emotional intelligence and subdimensions of Optimism/Mood Regulation, Appraisal of Emotions, and Utilization of Emotions. Fear of pain and pain experience were the dependent variables. The hypothesis that higher emotional intelligence and results in less fear of pain among surgical patients was tested using various statistical analyses.<sup>25</sup>

### Sampling and Setting

For this study, the researchers employed a descriptive correlational design. The study sample consisted of 254 patients who underwent elective surgery at inpatient clinics (ie, General Surgery, Urology, Reconstructive and Plastic Surgery, Orthopedics, Cardiovascular Surgery, Cardiology, Ophthalmologic Surgery, Neurosurgery, Chest and Pulmonary Surgery and Otolaryngologic surgery) of a university health practice and research hospital in Turkey. The minimum sample size was calculated as 171 according to the 0.05 probability level, 95% power, and 0.15 anticipated effect size parameters using G-power 3.9.1 Software. Data were generated from data collection tools completed by patients who applied for anesthesia approval for planned and day surgery in the hospital's surgical units between December 2021 and December 2022. The study subjects met the following criteria: (1) age 18 years or older; (2) consent to participate in the research; (3) able to read and write

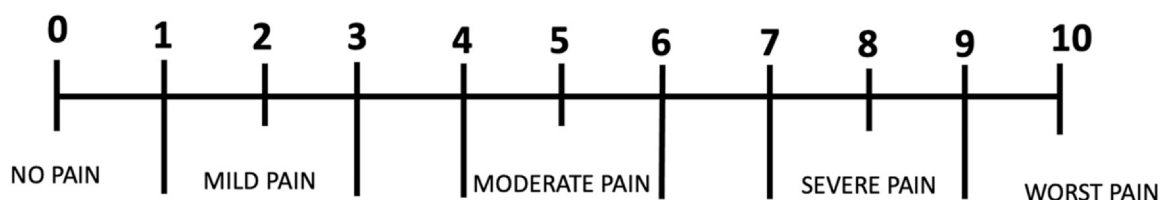


Figure 2. Numerical pain scale.<sup>25</sup>

in Turkish and not no hearing or speech disability or neurological disorder that prevented verbal communication; (4) the preoperative period. The exclusion criteria were; (1) hemodynamic instability of the patient during the preoperative period, (2) unexpected change in the surgical plan from elective to emergency surgery (3) having a psychiatric disorder.

### Ethical Considerations

The ethical permission to conduct this study was obtained from the University Noninterventional Clinical Research Ethics Committee of the University (E-25403353-050.99-266010/22.12.2021/2021-366) for studies involving humans. The institutional permission was obtained from the University Health, Practice, and Research Hospital directory (E-93877713-044-292519/17.02.2022). Written informed consent was obtained from each participant; they signed the consent forms and were informed that the data would be only used for scientific purposes and would be kept confidential. All study procedures were performed in accordance with the Helsinki Declaration and ethical standards.

### Data Collection

The data were collected using a Personal Characteristics Information Form which consisted of questions to determine demographic information such as gender, marital status, literacy level, previous surgical history, previous surgery in the same area, and additional health problems. In addition, emotional intelligence levels and fear of the patient's pain were determined by the Modified Schutte Emotional Intelligence Scale (EIS), Fear of Pain Questionnaire-III (FPQ-III). Patients who met the inclusion criteria were informed of the purpose of the research and invited by the researchers to participate as volunteers. All the patients' written, and verbal informed consent were obtained before the study. Patients who did not want to participate in the study were assured that this would not have any adverse effect on their treatment. In the surgical services where the study was performed, patients were usually seen in the anesthesia and reanimation clinic 1 or 2 weeks before surgery for anesthesia approval. The data for the study were collected when the patients came to the anesthesia and reanimation clinic to obtain approval for anesthesia before surgical intervention. The patients completed the data collection forms themselves. For illiterate patients, the questions were read aloud by the patient's companion or the researcher, and the patient's response was recorded on the questionnaire. The data collection forms were administered to patients ranging from 15 to 25 minutes with a mean duration of 20 minutes, and all responses were recorded.

### Modified Schutte Emotional Intelligence Scale (EIS)

The scale developed by Schutte, Malouff, Hall, Haggerty, Cooper, Golden, and Dornheim consists of 33 items and a single-factor structure as it was first created.<sup>24,26</sup> The Schutte Emotional Intelligence Scale was later revised by Austin, Saklofese, Huang, and McKenney.<sup>16</sup> Within the study framework, the scale was increased to 41 items. In addition, some of the existing items in the first version of the scale were reversed, and some new items were added to the scale. The researchers named the factors they suggested in the new form of the scale as Optimism/Mood Regulation, Appraisal of Emotions, and Utilization of Emotions.<sup>26,27</sup> The scale measures people's management of emotions with themselves and others, perception of emotions, and use of emotions.<sup>27</sup> Response options are in 5-point Likert type and 1; strongly disagree, 2; disagree, 3; no idea, 4; disagree, 5; totally disagree. The Turkish adaptation of the Modified Schutte Emotional Intelligence Scale and validity reliability

analysis was performed by Tatar et al.<sup>26</sup> The Cronbach's alpha internal consistency coefficient for the entire scale was 0.82 and for the subscales was 0.75, 0.39, and 0.76. Test-retest reliability for the whole scale within one week was found to be  $r = 0.49$  ( $n = 88$ ), and within two weeks, it was  $r = 0.56$  ( $n = 85$ ).<sup>24</sup> In the current study, Cronbach's alpha coefficient of the Modified Schutte EIS was 0.854.

### Fear of Pain Questionnaire -III (FPQ-III)

McNeil and Rainwater developed the FPQ-III, a 30-item 5-point Likert-type scale, to measure fear and anxiety about pain.<sup>28</sup> Participants mark the option that best describes the severity of their fear according to their pain experiences regarding the items listed on the scale. If they have never experienced the pain specified in these items, they indicate how severe fear would be, assuming they had experienced it. In this respect, the scale allows for measuring the fear of the pain of individuals with and without pain. The scale consists of 3 subdimensions with ten items in each dimension. Likert-type scoring is ranged from 1 to 5 (1-never, 2-somewhat, 3-quite, 4-a lot, 5-extremely). A (1) means the fear is never felt, and (5) that pain is felt excessively. The lowest score in total is 30, and the highest is 150. The lowest score for the subdimensions is 10, and the highest is 50. McNeil and Rainwater found the Cronbach alpha coefficients of the scale were 0.88 for the "fear of severe pain" subdimension, 0.87 for the "mild fear of pain" subdimension, 0.87 for the "fear of medical pain" subdimension and 0.92 for all items.<sup>17</sup> The Turkish adaptation of the FPQ-III and its validity-reliability analysis was performed by Ünver and Turan.<sup>29</sup> The Cronbach's alpha coefficient for the overall scale was 0.938, and the test-retest reliability was 0.846.<sup>29</sup> In the current study, Cronbach's alpha coefficient of the FPQ-III was found to be 0.914.

### Numerical Pain Scale

The numerical pain scale (NPS) is a scale with increasing numbers evenly spaced on a line, and pain intensity increases as the number increases. Numbers can be between 0 and 10 or 0 to 100.<sup>25</sup> Therefore, a numerical pain scale, which includes numbers between 0 and 10, with 0 indicating "I have no pain" and 10 indicating "I have the worst pain imaginable," was used in the study (Figure 2).<sup>25</sup>

### Data Analysis

All analysis was conducted by Statistical Package for the Social Sciences version 28.0, and the significance level was set at an alpha level of 0.05 (two-tailed). The scale dimensions and total scores were tested for their compliance with normal distribution by Kolmogorov Smirnov Test. Except for the total score of the FPQ-III, all dimensions of both scales did not show a normal distribution. Therefore, nonparametric tests were used to analyze these dimensions, while the total score of FPQ-III was analyzed with parametric tests. As a result, the correlation strength was considered very weak in the range of 0 to 0.19, weak in the range of 0.2 to 0.39, moderate in the range of 0.4 to 0.59, strong in the range of 0.6 to 0.79, and very strong in the range of 0.8 to 1.0.

### Findings

The sample consisted of 254 patients waiting for their planned surgical intervention; among them, 57.9% ( $n = 147$ ) were female, and the mean age was  $47.33 \pm 17.70$  years. For almost half of the patients ( $n = 122$ ), it was their first surgical intervention, and among the ones who had undergone surgery before ( $n = 132$ ), 37.1% ( $n = 49$ ) had surgery in the same body area (Table 1).

**Table 1**  
Descriptive Characteristics of the Participants (N = 254)

| Characteristics                   |            |
|-----------------------------------|------------|
| Gender                            |            |
| Male                              | 147 (57.9) |
| Female                            | 107 (42.1) |
| Marital status                    |            |
| Single                            | 82 (32.3)  |
| Married                           | 172 (67.7) |
| Literacy level                    |            |
| Literate*                         | 13 (5.1)   |
| Elementary School                 | 70 (27.6)  |
| Middle School                     | 29 (11.4)  |
| High School                       | 56 (22.0)  |
| University Degree                 | 86 (33.9)  |
| Past surgical history             |            |
| Yes                               | 132 (52.0) |
| No                                | 122 (48.0) |
| Previous surgery in the same area |            |
| Yes                               | 49 (37.1)  |
| No                                | 83 (62.9)  |
| Additional health problems        |            |
| Yes                               | 89 (35.0)  |
| No                                | 165 (65.0) |

\* No schooling, but literate.

The participants expected to have postoperative pain at an average intensity of 5.17 ± 2.74 out of 10. On the FPQ-III, patients had the highest mean scores on the severe pain subdimension, while the highest mean scores on the Modified Schutte EIS were found on the optimism/mood regulation sub-dimension (Table 2).

Regarding the relationship between fear of pain and the Modified Schutte EIS (Table 3), a moderate positive and statistically significant ( $P < .01$ ) correlation was observed between the Fear of Severe Pain and Optimism/Mood Regulation subdimensions ( $r = 0.491$ ) and the total score of modified Schutte EIS ( $r = 0.417$ ). Fear of Minor Pain and Medical Pain showed weak, negative, and statistically significant ( $P < .05$  and  $P < .01$ , respectively) correlations with the Appraisal of Emotions sub-dimension. The total score of FPQ-III showed between very weak and weak, positive and statistically significant ( $P < .01$ ) correlation with the subdimension of Optimism/Mood Regulation ( $rs = 0.280$ ) and the total score of modified EIS ( $rs = 0.195$ ), respectively. Additionally, the total score of FPQ-III showed a negative, very weak, but statistically significant ( $P < .05$ ) correlation with the Appraisal of Emotions subdimension of modified EIS ( $rs = -0.132$ ).

Regarding gender, we found that female patients had significantly more fear of Severe Pain ( $P < .05$ ), Minor Pain ( $P < .001$ ), and Medical

**Table 2**  
The Intensity of the Patient's Pain as Assessed by the Numerical Pain Scale and Item-Level Analysis of the FPQ-III and Modified Schutte EIS (N = 254)

|   |                          | N (%)          |
|---|--------------------------|----------------|
| Having preoperative pain                      | Yes                      | 174 (68.5)     |
|   | No                       | 80 (31.5)      |
| The intensity of the preoperative pain        | Mild (1-3)               | 62 (35.6)      |
|   | Moderate (4-6)           | 61 (35.1)      |
|   | Severe (7-10)            | 51 (29.3)      |
|   |                          | Mean ± SD      |
| Average preoperative pain intensity           |                          | 3.37 (3.255)   |
| Average expected postoperative pain intensity |                          | 5.17 (2.746)   |
| Fear of Pain Questionnaire (FPQ)-III          | Severe pain              | 33.60 ± 8.31   |
|   | Minor pain               | 21.25 ± 6.47   |
|   | Medical pain             | 24.19 ± 7.93   |
|   | Total score              | 79.04 ± 18.89  |
| Modified Schutte EIS                          | Optimism/mood regulation | 76.77 ± 15.06  |
|   | Appraisal of emotions    | 47.04 ± 7.70   |
|   | Utilization of emotions  | 23.53 ± 4.78   |
|   | Total score              | 147.34 ± 18.64 |

SD, Standard Deviation; EIS, emotional intelligence scale.

**Table 3**  
Correlations Between FPQ-III and Modified Schutte EIS (N = 254)

| FPQ Scale dimensions | EI scale dimensions                     |  |                         |  |
|----------------------|---|--|-------------------------|--|
|                      | Optimism/Mood regulation                | Appraisal of emotions                  | Utilization of emotions | Total score modified Schutte EIS       |
| Severe pain          | <b>r = 0.491</b><br><b>P &lt; .01*</b>  | r = -0.032<br>P = .617                 | r = 0.033<br>P = .599   | <b>r = 0.417</b><br><b>P &lt; .01*</b> |
| Minor pain           | r = 0.075<br>P = .232                   | <b>r = -0.123</b><br><b>P = .050*</b>  | r = 0.095<br>P = .132   | r = 0.005<br>P = .943                  |
| Medical pain         | r = 0.055<br>P = .381                   | <b>r = -0.166</b><br><b>P = .008*</b>  | r = 0.105<br>P = .094   | r = 0.015<br>P = .808                  |
| Total score FPQ      | <b>rs = 0.280</b><br><b>P &lt; .01*</b> | <b>rs = -0.132</b><br><b>P = .036*</b> | rs = 0.093<br>P = .139  | <b>rs = 0.195</b><br><b>P = .002*</b>  |

EIS, emotional intelligence scale; FPQ, fear of pain questionnaire; r, person correlation analysis; rs, spearman correlation analysis.

\* Indicates that a statistically significant difference ( $P < 0.005$ ).

Pain ( $P < .01$ ) in comparison to male patients. Female patients also had higher scores in the total score of FPQ-III ( $P < .01$ ). Concerning emotional intelligence, the female patients had higher scores than male patients in the subdimensions of Optimism/Mood Regulation ( $P < .01$ ) and Utilization of Emotions ( $P < .01$ ) and in the total score of modified Schutte EIS ( $P < .01$ ). Furthermore, we found that the patients with a past surgical history significantly had more fear of Minor Pain ( $P < .05$ ) and had higher scores in the total FPQ ( $P < .05$ ). Regarding patient characteristics such as marital status, literacy level, previous surgery and additional health problems, we found no statistical significance with FPQ-III and Modified Schutte EIS Scales ( $P > .05$ ) (Table 4).

## Discussion

### Patients' Fear of Pain

The fear of pain was determined as moderate-intensity in terms of the total and sub-dimensions of the patients participating in the study. When the subdimensions were compared, it was determined that they had the highest fear of severe pain and the second highest fear of medical pain. Fear of experiencing severe pain for surgical and medical intervention is an expected outcome. However, patients reported higher expected postoperative pain intensity levels than they experienced before the surgical operation. These conditions may be associated with acute pain experienced by patients in their past surgical history. Due to inadequate management of acute pain, patients experience fear of pain again. The experience of severe pain is associated with the fear of pain.<sup>30,31</sup> People who have undergone surgery and experienced pain before can develop a memory for fear of pain<sup>32,33</sup> and also have a high probability of experiencing pain fear.<sup>34</sup> Çarık<sup>35</sup> and Üstünel<sup>36</sup> determined that the majority of the patients experienced moderate-intensity of pain fear in the pre-operative period, which is similar to our study.<sup>35,36</sup> On the other hand, in the studies conducted, the researchers determined that the patients experienced the most "fear of severe pain" and "fear of medical pain," which is similar to our study results.<sup>35–37</sup>

While fear of pain differed by gender, there was no significant difference in other demographic data. For example, studies have reported that while pain threshold and tolerance are lower in females compared to males,<sup>38</sup> pain sensitivity and fear of pain are higher.<sup>35–37,39</sup> Similar to the literature, the fear of pain levels of female patients who participated in the study was higher in severe, minor, medical pain, and total pain scores than that of male patients. Again, the high number of female patients in the research should be considered in this result.

**Table 4**  
Distribution of FPQ and Modified Schutte EI Scale Scores According to Descriptive Characteristics (n = 254)

| Features (n)                            |                           | FPQ scale dimensions               |                                    |                                    |                                | EIS Scale Dimensions                  |                                     |  |                                    |
|---|---------------------------|------------------------------------|------------------------------------|------------------------------------|--------------------------------|---------------------------------------|-------------------------------------|--|------------------------------------|
|   |                           | Severe pain<br>X ± SD              | Minor pain<br>X ± SD               | Medical pain<br>X ± SD             | Total score<br>X ± SD          | Optimism/mood<br>regulation<br>X ± SD | Appraisal of<br>emotions<br>X ± SD  | Utilization of<br>emotions<br>X ± SD       | Total score<br>X ± SD              |
| Gender                                  | Female (147)              | 34.46 ± 8.43                       | 22.44 ± 6.74                       | 25.39 ± 8.07                       | 82.30 ± 19.21                  | 78.56 ± 15.63                         | 47.82 ± 7.65                        | 24.27 ± 4.46                               | 150.65 ± 19.64                     |
|   | Male (107)                | 32.42 ± 8.03                       | 19.61 ± 5.73                       | 22.53 ± 7.46                       | 74.56 ± 17.56                  | 74.31 ± 13.93                         | 45.97 ± 7.66                        | 22.51 ± 5.03                               | 142.79 ± 16.18                     |
|   | Test /p                   | Z: -2.013<br><b>P = .044*</b>      | Z: -3.503<br><b>P = .000*</b>      | Z: -2.972<br><b>P = .003*</b>      | t: 3.285<br><b>P = .001*</b>   | Z: -3.010<br><b>P = .003*</b>         | Z: -1.476<br>P = .140               | Z: -2.685<br><b>P = .007</b>               | Z: -3.171<br><b>P = .002</b>       |
| Marital status                          | Single (82)               | 33.02 ± 8.42                       | 21.13 ± 6.67                       | 24.32 ± 7.53                       | 78.48 ± 18.57                  | 75.67 ± 15.69                         | 46.24 ± 8.39                        | 23.77 ± 5.06                               | 145.68 ± 19.74                     |
|   | Married (172)             | 33.88 ± 8.28                       | 21.30 ± 6.40                       | 24.13 ± 8.14                       | 79.31 ± 19.09                  | 77.30 ± 14.76                         | 47.42 ± 7.34                        | 23.41 ± 4.66                               | 148.13 ± 18.09                     |
|   | Test /p                   | Z: -0.603<br>P = .546              | Z: -0.383<br>P = .702              | Z: -0.355<br>P = .723              | t: 0.328<br>P = .743           | Z: -0.807<br>P = .420                 | Z: -0.688<br>P = .492               | Z: -0.978<br>P = .328                      | Z: -1.014<br>P = .311              |
| Literacy level                          | Literate (13)             | 36.00 ± 7.00                       | 20.00 ± 6.57                       | 24.46 ± 8.50                       | 80.46 ± 20.10                  | 77.77 ± 14.37                         | 49.31 ± 5.99                        | 25.85 ± 2.64                               | 152.92 ± 18.03                     |
|   | Elementary<br>School (70) | 34.41 ± 7.88                       | 21.81 ± 6.73                       | 24.67 ± 6.82                       | 80.90 ± 17.22                  | 75.10 ± 15.08                         | 46.10 ± 8.54                        | 23.71 ± 4.70                               | 144.91 ± 17.90                     |
|   | Middle<br>School (29)     | 33.62 ± 8.31                       | 21.72 ± 6.18                       | 23.34 ± 9.19                       | 78.69 ± 20.57                  | 78.69 ± 14.05                         | 45.97 ± 8.15                        | 24.14 ± 5.11                               | 148.79 ± 20.09                     |
|   | High School (56)          | 33.29 ± 9.25                       | 21.16 ± 6.88                       | 24.89 ± 9.47                       | 79.34 ± 22.41                  | 78.77 ± 11.98                         | 47.02 ± 7.99                        | 21.82 ± 5.05                               | 147.61 ± 15.81                     |
|   | University<br>Degree (86) | 32.78 ± 8.23                       | 20.87 ± 6.16                       | 23.58 ± 7.24                       | 77.23 ± 17.13                  | 76.03 ± 17.22                         | 47.85 ± 6.80                        | 23.93 ± 4.57                               | 147.81 ± 20.56                     |
|   | Test /p                   | X <sup>2</sup> : 1.934<br>P = .748 | X <sup>2</sup> : 1.597<br>P = .809 | X <sup>2</sup> : 1.168<br>P = .883 | t: 0.619<br>P = .537           | X <sup>2</sup> : 2.011<br>P = .734    | X <sup>2</sup> : 3.114<br>P = .539  | X <sup>2</sup> : 10.342<br><b>P = .035</b> | X <sup>2</sup> : 2.522<br>P = .641 |
| Past surgical<br>history                | Yes (132)                 | 34.39 ± 8.43                       | 22.10 ± 6.68                       | 25.00 ± 8.45                       | 81.49 ± 20.34                  | 77.05 ± 14.87                         | 46.46 ± 7.98                        | 23.14 ± 4.66                               | 146.65 ± 17.74                     |
|   | No (122)                  | 32.75 ± 8.12                       | 20.33 ± 6.15                       | 23.31 ± 7.27                       | 76.39 ± 16.86                  | 76.48 ± 15.31                         | 47.67 ± 7.35                        | 23.94 ± 4.88                               | 148.09 ± 19.61                     |
|   | Test/p                    | Z: -1.456<br>P = .145              | Z: -2.165<br><b>P = .030*</b>      | Z: -1.418<br>P = .156              | t: -2.184<br><b>P = .030*</b>  | Z: -0.318<br>P = .750                 | Z: -1.820<br>P = .069               | Z: -1.594<br>P = .111                      | Z: -0.619<br>P = .536              |
| Previous<br>surgery in the<br>same area | Yes (49)                  | 35.57 ± 8.42                       | 23.16 ± 6.32                       | 26.04 ± 6.89                       | 84.78 ± 17.53                  | 77.47 ± 14.81                         | 47.16 ± 8.46                        | 22.14 ± 5.41                               | 146.78 ± 18.21                     |
|   | No (83)                   | 33.7 ± 8.41                        | 21.47 ± 6.84                       | 24.39 ± 9.23                       | 79.55 ± 21.70                  | 76.80 ± 15.00                         | 46.05 ± 7.71                        | 23.73 ± 4.08                               | 146.58 ± 17.57                     |
|   | Test /p                   | Z: -1.372<br>P = .170              | Z: -1.420<br>P = .156              | Z: -1.400<br>P = .162              | t: -1.430<br>P = .155          | Z: -0.071<br>P = .944                 | Z: -1.047<br>P = .295               | Z: -1.694<br>P = .090                      | Z: -0.059<br>P = .953              |
| Additional<br>health<br>problems        | Yes (89)                  | 34.39 ± 8.03                       | 21.25 ± 6.84                       | 23.06 ± 8.24                       | 78.70 ± 19.64                  | 77.19 ± 15.71                         | 46.34 ± 8.49                        | 23.27 ± 4.89                               | 146.80 ± 18.64                     |
|   | No (165)                  | 33.18 ± 8.44                       | 21.25 ± 6.29                       | 24.80 ± 7.72                       | 79.22 ± 18.53                  | 76.55 ± 14.74                         | 47.42 ± 7.23                        | 23.67 ± 4.73                               | 147.64 ± 18.79                     |
|   | Test /p                   | Z: -0.971<br>P = .332              | Z: -0.112<br>P = .911              | Z: -1.691<br>P = .091              | t: 0.242<br>P = .832           | Z: -0.449<br>P = .654                 | Z: -0.771<br>P = .440               | Z: -0.510<br>P = .610                      | Z: -0.306<br>P = .759              |
| Pain intensity                          | Preoperative              | 33.92 ± 7.83                       | 21.21 ± 6.32                       | 24.38 ± 7.55                       | 79.51 ± 17.46                  | 76.39 ± 15.20                         | 47.09 ± 7.49                        | 23.68 ± 4.78                               | 147.16 ± 18.69                     |
|   | Test /p                   | X <sup>2</sup> : 1.037<br>P = .596 | X <sup>2</sup> : 0.696<br>P = .706 | X <sup>2</sup> : 2.369<br>P = .306 | t: -58.401<br><b>P = .000*</b> | X <sup>2</sup> : 3.182<br>P = .204    | X: 10.552<br><b>P = .005</b>        | X <sup>2</sup> : 2.598<br>P = .273         | X <sup>2</sup> : 5.138<br>P = .077 |
|   | Expected<br>postoperative | 33.60 ± 8.31                       | 21.25 ± 6.47                       | 24.19 ± 7.93                       | 79.04 ± 18.89                  | 76.77 ± 15.06                         | 47.04 ± 7.70                        | 23.53 ± 4.78                               | 147.34 ± 18.64                     |
|   | Test /p                   | X <sup>2</sup> : 1.946<br>P = .992 | X <sup>2</sup> : 9.025<br>P = .435 | X <sup>2</sup> : 8.032<br>P = .531 | t: -62.783<br><b>P = .000*</b> | X: 6.635<br>P = .671                  | X <sup>2</sup> : 11.098<br>P = .269 | X <sup>2</sup> : 9.339<br>P = .407         | X <sup>2</sup> : 4.758<br>P = .855 |

SD, Standard Deviation; Z, Mann Whitney U Test; t, Independent Sample t-Test; X<sup>2</sup>, Kruskal Wallis Test; FPQ, fear of pain questionnaire; EIS, emotional intelligence scale.  
\* Indicates that a statistically significant difference (P < 0.005).

### Patients' Emotional Intelligence levels

Among the emotional intelligence subdimensions of the patients included in the study, the scores of the optimism/mood regulation subdimension were the highest. Patients' emotional intelligence levels differed by gender, while other demographics did not show significant differences. The study determined that females' total emotional intelligence level, optimism/mood regulation, and utilization of emotions were higher than males. In the literature, similar to our study, along with studies reporting that female's emotional intelligence levels are higher than males,<sup>40</sup> Gür et al found that males and females have similar levels of emotional intelligence, can use their emotions equally, and are similarly optimistic. They also found that men are more skilled than women in evaluating their emotions.<sup>41</sup>

### The Relationship Between Levels of Emotional Intelligence and Fear of Pain

Our results suggest that emotional intelligence is an important element in the processing of emotional information accompanying a painful experience, and that emotional intelligence influences subjective pain perception. Overall, we determined that emotional

intelligence level affected the fear of pain experienced by patients before surgery. Our results showed that patients with a high level of emotional intelligence had a greater fear of pain in the preoperative period. The finding that the fear of pain increased with the emotional intelligence level of the patients in the study can be explained by the fact that patients with high emotional intelligence levels are better able to identify and recognize negative emotions.<sup>42</sup> Although there are no similar studies in the literature, in contrast to our study, there are studies reporting that negative emotions such as anxiety<sup>43–46</sup> and depression<sup>44,46</sup> are reduced in people with high emotional intelligence.

In the literature, it is reported that with an increase in the level of emotional intelligence, which is associated with psychological well-being, the negative emotions felt due to the disease may decrease and turn into positive ones<sup>34</sup> and increased emotional intelligence will support recovery after the experience of pain.<sup>47</sup> In our study, patients' mean scores were highest on the optimism/mood regulation subdimension of emotional intelligence. At the same time, the patients in our study stated that they expected to experience more pain in the postoperative period compared to the preoperative period, and their pain fear levels were found to be high. This is consistent with the literature and this situation can be explained by the fact that patients try to reduce the effect of the negative

emotions they feel on psychological well-being and transform them into positive ones by effectively using the optimism/mood regulation of their emotional intelligence, despite the fear of pain they experience.

## Conclusion

While the patients' scores of "optimism/mood regulation," one of the components of emotional intelligence, was higher than the other components, "fear of severe pain" was found to be at the highest level. The females in the study had higher levels of emotional intelligence and fear of pain than males. In the preoperative period, as the patients' emotional intelligence levels increased, their fear of pain also increased, and despite the fear of experiencing severe pain, the patients tried to turn this negative situation into a positive one. The increasing level of Emotional Intelligence and "appraisal of emotions" might result in a decrease in the levels of fear of "minor pain" and "medical pain".

## Implications for Research, Policy, and Practice

In line with the results, the determination of fear, anxiety, other negative emotions and causes of postoperative pain, determination of patients' knowledge levels and coping methods for postoperative pain management, determination of other factors that will affect patients' emotional intelligence levels, and implementation of interventions for all these before and after patient care will contribute positively to the results. It is important to apply interventions, provide individual care or training, and teach coping methods for pain control, considering that the perception and evaluation of pain, especially fear of pain, may differ between genders.

## Limitations of the Study

The data obtained from the study were limited only to patients in a training and research hospital. In this context, the results of the study cannot be generalized to all surgical patients. In this study emotional intelligence and fear of pain measurements were limited by the scale tool and detailed causes were not evaluated. Despite the high reliability and validity of the scales, self-report measures are themselves subjective and prone to bias. Therefore, the results of the emotional intelligence and fear of pain scales are limited by the scale items, patients' personalities and some descriptive characteristics. To increase the validity and reliability of the results of the study, it is recommended to expand the scope of the study and to apply the sample size in larger groups and in surgical units in different hospitals.

## Declaration of Competing Interest

The authors declare that they have no competing financial interests or personal relationships that could influence the work reported in this paper.

## Acknowledgments

The authors would like to thank the patients for participating in this study.

## References

- Raja SN, Carr DB, Cohen M, et al. The revised International Association for the Study of Pain definition of pain: concepts, challenges, and compromises. *Pain*. 2020;161(9):1976–1982. <https://doi.org/10.1097/j.pain.0000000000001939>.
- Parmelee PA, Scicolone MA, Cox BS, DeCaro JA, Keefe FJ, Smith DM. Global versus momentary osteoarthritis pain and emotional distress: emotional intelligence as moderator. *Ann Behav Med*. 2018;52(8):713–723. <https://doi.org/10.1093/abm/kax044>.
- Kopera M, Brower KJ, Suszek H, et al. Relationships between components of emotional intelligence and physical pain in alcohol dependent patients. *J Pain Res*. 2017;10:1611–1618. <https://doi.org/10.2147/JPR.S134019>.
- Strobel C, Hunt S, Sullivan R, Sun J, Sah P. Emotional regulation of pain: the role of noradrenaline in the amygdala. *Sci China Life Sci*. 2014;57(4):384–390. <https://doi.org/10.1007/s11427-014-4638-x>.
- Lumley MA, Cohen JL, Borszcz GS, et al. Pain and emotion: a biopsychosocial review of recent research. *J Clin Psychol*. 2011;67(9):942–968. <https://doi.org/10.1002/jclp.20816>.
- Day MA, Ward LC, Thorn BE, et al. Mechanisms of mindfulness meditation, cognitive therapy, and mindfulness-based cognitive therapy for chronic low back pain. *Clin J Pain*. 2020;36(10):740–749. <https://doi.org/10.1097/AJP.0000000000000862>.
- Ericsson M, Poston WS, Linder J, Taylor JE, Haddock CK, Foreyt JP. Depression predicts disability in long-term chronic pain patients. *Disabil Rehabil*. 2002;24(6):334–340. <https://doi.org/10.1080/09638280110096241>.
- Shin LM, Liberzon I. The neurocircuitry of fear, stress, and anxiety disorders. *Neuropsychopharmacology*. 2010;35(1):169–191. <https://doi.org/10.1038/npp.2009.83>.
- Rost S, Van Ryckeghem DML, Koval P, Sütterlin S, Vögele C, Crombez G. Affective instability in patients with chronic pain: a diary approach. *Pain*. 2016;157(8):1783–1790. <https://doi.org/10.1097/j.pain.0000000000000582>.
- Poulin PA, Romanow HC, Rahbari N, et al. The relationship between mindfulness, pain intensity, pain catastrophizing, depression, and quality of life among cancer survivors living with chronic neuropathic pain. *Support Care Cancer*. 2016;24(10):4167–4175. <https://doi.org/10.1007/s00520-016-3243-x>.
- Wong WS, Lam HM, Chow YF, et al. The effects of anxiety sensitivity, pain hypervigilance, and pain catastrophizing on quality of life outcomes of patients with chronic pain: a preliminary, cross-sectional analysis. *Qual Life Res*. 2014;23(8):2333–2341. <https://doi.org/10.1007/s11136-014-0683-y>.
- Anagnostopoulos F, Paraponiari A, Kafetsios K. The role of pain catastrophizing, emotional intelligence, and pain intensity in the quality of life of cancer patients with chronic pain. *J Clin Psychol Med Sett*. 2023;30(3):501–519. <https://doi.org/10.1007/s10880-022-09921-5>.
- Allen JC. *Emotional Intelligence. The Emotional Intelligence Book Emotional Intelligence at Work and Emotional Intelligence Leadership*. 1st ed. Healthy Lifestyles; 2017:1–39 Editorial imagen LLC.
- Doherty EM, Walsh R, Andrews L, McPherson S. Measuring emotional intelligence enhances the psychological evaluation of chronic pain. *J Clin Psychol Med Settings*. 2017;24(3-4):365–375. <https://doi.org/10.1007/s10880-017-9515-x>.
- Luque-Reca O, Pulido-Martos M, Gavilán-Carrera B, et al. Emotional intelligence impairments in women with fibromyalgia: Associations with widespread pain. *J Health Psychol*. 2021;26(11):1901–1912. <https://doi.org/10.1177/1359105319890916>.
- Erdoğan MY. Research On emotional quotient in terms of certain variables. *Electron J Soc Sci*. 2008;7(23):62–76(<https://dergipark.org.tr/tr/download/article-file/70012>).
- Yılmaz M. Nephrology nursing and emotional intelligence. *J Nephrol Nurs*. 2015;10(2):13–18(<https://dergipark.org.tr/tr/download/article-file/292253>).
- Szczygiel D, Mikołajczak M. Why are people high in emotional intelligence happier? They make the most of their positive emotions. *Person Individ Differ*. 2017;2017(117):177–181. <https://doi.org/10.1016/j.paid.2017.05.051>.
- Mendelson RA, Lauderdale FL, Etafy M, Brahmhatt J, Parekattil S, Clermont F. Higher trait emotional intelligence correlates to lower chronic scrotal content pain and better work engagement. *J Urol*. 2019;201(4):e769. <https://doi.org/10.1097/01.JU.0000556502.65019.15>.
- Sommaruga M, Casu G, Giaquinto F, Gremigni P. Self-perceived provision of patient centered care by healthcare professionals: the role of emotional intelligence and general self-efficacy. *Patient Educ Couns*. 2017;100(5):974–980. <https://doi.org/10.1016/j.pec.2016.12.002>.
- Ruiz-Aranda D, Salguero JM, Fernández-Berrocal P. Emotional regulation and acute pain perception in women. *J Pain*. 2010;11(6):564–569. <https://doi.org/10.1016/j.jpain.2009.09.011>.
- Extremera N, Fernández-Berrocal P. Relation of perceived emotional intelligence and health-related quality of life of middle-aged women. *Psychol Rep*. 2002;91(1):47–59. <https://doi.org/10.2466/pr0.2002.91.1.47>.
- Mavroveli S, Petrides KV, Rieffe BF. Trait emotional intelligence, psychological well being and peer rated social competence in adolescence. *Br J Dev Psychol*. 2007;25(2):263–275. <https://doi.org/10.1348/026151006x118577>.
- Schutte NS, Malouff JM, Hall LE, et al. Development and validation of a measure of emotional intelligence. *Pers Individ Differ*. 1998;25(2):167–177. [https://doi.org/10.1016/S0191-8869\(98\)00001-4](https://doi.org/10.1016/S0191-8869(98)00001-4).
- Hadjistavropoulos T, Herr K, Turk DC, et al. An interdisciplinary expert consensus statement on assessment of pain in older persons. *The Clinical Journal of Pain*. 2007;23(1 Suppl):S1–S43. <https://doi.org/10.1097/AJP.0b013e31802be869>.
- Tatar A, Tok S, Saltukoğlu G. Adaptation of the revised schutte emotional intelligence scale into Turkish and examination of its psychometric properties. *Bull Clin Psychopharmacol*. 2011;21(4):325–338. <https://doi.org/10.5455/bcp.20110624015920>.
- Austin EJ, Saklofske DH, Huang SHS, McKenney D. Measurement of trait emotional intelligence: testing and cross validating a modified version of Schutte et al.'s (1998) measure. *Pers Individ Differ*. 2004;36(3):555–562. [https://doi.org/10.1016/S0191-8869\(03\)00114-4](https://doi.org/10.1016/S0191-8869(03)00114-4).

28. McNeil DW, Rainwater 3rd AJ. Development of the fear of pain questionnaire-III. *J Behav Med.* 1998;21(4):389–410. <https://doi.org/10.1023/a:1018782831217>.
29. Ünver S, Turan FN. Ağrı Korkusu Ölçeği-III'ün Türkçe geçerlilik ve güvenilirlik çalışması. *Ağrı Dergisi.* 2018;30(1):18–27. <https://doi.org/10.5505/agri.2017.62681>.
30. Luo Y, He J, Bao L, Meng H, Hu C, Chen Q. Fear of pain as a predictor for post-operative pain intensity among the patients undergoing thoracoscopic surgery. *Pain Res Manag.* 2022;1–6. <https://doi.org/10.1155/2022/2201501>.
31. Tiryaki S, Göktaş S. Diz Artroskopisi Uygulanacak Hastalarda Ağrı Korkusununun Ağrı Şiddetine Etkisinin Değerlendirilmesi: Tanımlayıcı Araştırma. *Türkiye Klinikleri J Nurs Sci.* 2022;14(2):288–295. [https://doi.org/10.17932/IAU.TFK.2018.008/tfk\\_v04i3006](https://doi.org/10.17932/IAU.TFK.2018.008/tfk_v04i3006).
32. Fischer S, Vinall J, Pavlova M, et al. Role of anxiety in young children's pain memory development after surgery. *Pain.* 2019;160(4):965–972. <https://doi.org/10.1097/j.pain.0000000000001473>.
33. Babel P. The influence of state and trait anxiety on the memory of pain. *Pain Med.* 2017;18(12):2340–2349. <https://doi.org/10.1093/pm/pnw354>.
34. Rey L, Extremera N, Trillo L. Exploring the relationship between emotional intelligence and health related quality of life in patients with cancer. *J Psychosoc Oncol.* 2013;31(1):51–64. <https://doi.org/10.1080/07347332.2012.703770>.
35. Çarık, S. The effect of pre-operational pain fear on post-operative pain and general comfort. Published master's thesis. Istinye University, 2020 İstanbul.
36. Üstünel F. *Determining Patients' Fear of Pain in the Preoperative Period.* Adana: Çukurova University; 2020.
37. Zhang H, Bi Y, Hou X, Lu X, Tu Y, Hu L. The role of negative emotions in sex differences in pain sensitivity. *Neuroimage.* 2021;245:118685. <https://doi.org/10.1016/j.neuroimage.2021.118685>.
38. Mittinty MM, McNeil DW, Brennan DS, Randall CL, Mittinty MN, Jamieson L. Assessment of pain related fear in individuals with chronic painful conditions. *J Pain Res.* 2018;11:3071–3077. <https://doi.org/10.2147/JPR.S163751>.
39. Di Tella M, Ghiggia A, Testa S, Castelli L, Adenzato M. The Fear of Pain Questionnaire: factor structure, validity and reliability of the Italian translation. *PLoS One.* 2019;14(1):e0210757. <https://doi.org/10.1371/journal.pone.0210757>
40. Ghahramani S, Jahromi AT, Khoshroor D, Seifooripour R, Sepehrpoor M. The relationship between emotional intelligence and happiness in medical students. *Korean J Med Educ.* 2019;31(1):29–38. <https://doi.org/10.3946/kjme.2019.116>.
41. Gür EY, Altınayak SÖ, Apay SE. Duygusal zekânın cinsiyet değişkeni açısından incelenmesi. *Gümüşhane Üniversitesi Sağlık Bilimleri Dergisi.* 2019;8(2):35–42. (<https://dergipark.org.tr/tr/pub/gumussagbil/issue/46106/442048>).
42. Fu W, Wilhelm LO, Wei Y, Zhou G, Schwarzer R. Emotional intelligence and dyadic satisfaction buffer the negative effect of stress on prenatal anxiety and depressive symptoms in Chinese women who are pregnant with twins. *Anxiety Stress Coping.* 2020;33(4):466–478. <https://doi.org/10.1080/10615806.2020.1745193>.
43. Baudry AS, Anota A, Mariette C, et al. the FREGAT Working Group. The role of trait emotional intelligence in quality of life, anxiety and depression symptoms after surgery for esophageal or gastric cancer: a French national database FREGAT. *Psycho Oncology.* 2019;28(4):799–806. <https://doi.org/10.1002/pon.5023>.
44. Amirifard N, Payandeh M, Aeinfar M, Sadeghi M, Sadeghi E, Ghafarpor S. A survey on the relationship between emotional intelligence and level of depression and anxiety among women with breast cancer. *Int J Hematol Oncol Stem Cell Res.* 2017;11(1):54–57.
45. Obeid S, Lahoud N, Haddad C, Sacre H, Fares K, Akel M, Hallit S. Factors associated with anxiety among the Lebanese population: the role of alexithymia, self esteem, alcohol use disorders, emotional intelligence and stress and burnout. *Int J Psychiatry Clin Pract.* 2020;24(2):151–162. <https://doi.org/10.1186/s12889-020-8345-1>.
46. Alkan H, Bingölbali Ö. Investigation of the relationship between emotional intelligence and quality of life, and depression, anxiety, and stress in patients with osteoarthritis. *Dicle Tıp Dergisi.* 2022;49(1):45–52. <https://doi.org/10.5798/dicletip.1086133>.
47. Ruiz-Aranda D, Salguero JM, Fernández-Berrocal P. Emotional intelligence and acute pain: the mediating effect of negative affect. *J Pain.* 2011;12(11):1190–1196. <https://doi.org/10.1016/j.jpain.2011.06.008>.