



Research Article

Pain, Anxiety, and Sleep Quality in Patients after Laparoscopic Cholecystectomy

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Abstract

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Objective: Postoperative pain, anxiety, and sleep disturbances are common problems that can negatively impact recovery and prolong hospital stay in surgical patients. Identifying these factors is critical to improving patient outcomes. This study aimed to assess pain, anxiety, and sleep quality in patients following laparoscopic cholecystectomy.

Method: This descriptive, observational study included 30 patients who underwent laparoscopic cholecystectomy. On the first postoperative day, pain, anxiety, and sleep quality were evaluated using the Numeric Rating Scale, Hospital Anxiety and Depression Scale (HADS), and Richard-Campbell Sleep Questionnaire (RCSQ). Descriptive statistics and Pearson correlation analysis were used.

Results: The mean age of participants was 49.33 ± 14.06 , and 56.67% were male. A statistically significant negative correlation was found between sleep quality and anxiety scores ($p < 0.05$). Moderate negative correlations were also observed between sleep quality and both anxiety ($r = -0.376$) and depression ($r = -0.466$).

Conclusion: Postoperative pain, anxiety, and poor sleep quality are interconnected and may adversely affect recovery and hospital stay in patients undergoing laparoscopic cholecystectomy.

Keywords: Anxiety, Laparoscopic cholecystectomy, Pain, Sleep

INTRODUCTION

Laparoscopic cholecystectomy is a minimally invasive surgical technique that is frequently preferred for the treatment of gallbladder diseases (Ilkaz et al., 2023). Although it is less invasive than open cholecystectomy, patients often experience significant postoperative pain, anxiety, and consequently sleep disturbances after this procedure (Duran, 2024). While postoperative pain is generally regarded by patients as an expected outcome, it can reach levels that adversely affect quality of life (Bülbüloğlu et al., 2021).

Another common problem in surgical patients is sleep disturbances (Para & Uslu, 2022). Various factors such as postoperative pain, anxiety, and hospital-related stress can adversely affect sleep quality (Lin et al., 2021). The relationship between sleep and pain is complex and interdependent: pain disturbs sleep, whereas poor-quality sleep amplifies pain perception (Whibley et al., 2019). Consequently, postoperative sleep problems may prolong recovery and negatively affect overall well-being (Gündoğdu & Deljavan, 2023).

There is a strong association between anxiety, pain, and sleep. Preoperative and postoperative anxiety can diminish pain tolerance and interfere with sleep continuity, thereby reducing sleep quality (Yaman Aktaş & Bahadır Yılmaz, 2017). Thus, the interplay among sleep, pain, and anxiety constitutes an important clinical issue with direct implications for physical and psychological health (Whibley et al., 2019). This interaction meaningfully shapes the postoperative recovery process, especially in surgical patients (Para & Uslu, 2022).

Therefore, a holistic evaluation of pain, anxiety, and sleep in patients undergoing laparoscopic cholecystectomy and the development of effective nursing strategies to mitigate these issues are of great importance. In particular,

objectively assessing sleep quality and planning timely interventions can accelerate postoperative recovery (Gündoğdu & Deljavan, 2023).

The purpose of this pilot study is to evaluate the postoperative pain, anxiety, and sleep problems experienced by patients who have undergone laparoscopic cholecystectomy, and to examine the relationships among these issues. In line with this aim, the study seeks to highlight the role of nursing care in managing these conditions and to develop recommendations for improving postoperative recovery.

Research Questions

- What is the level of pain experienced by individuals who undergo laparoscopic cholecystectomy in the postoperative period?
- What is the level of anxiety these individuals experience after surgery?
- What is the sleep quality of patients following laparoscopic cholecystectomy?
- Is there a statistically significant relationship among postoperative pain, anxiety, and sleep quality?

METHOD

Setting

This pilot study was conducted in the surgical unit of a hospital located on the European side of Istanbul. On the first postoperative day, patients who had undergone laparoscopic cholecystectomy were assessed for pain, anxiety, and sleep quality.

Inclusion Criteria:

- Adult patient
- Voluntary participation in the study
- Ability to communicate in Turkish
- Underwent laparoscopic cholecystectomy

Exclusion Criteria:

- Patients who underwent open (laparotomy) cholecystectomy

The independent variables were the participants' demographic characteristics, including age, sex, and educational level, while the dependent variables were the total scores obtained from the scales measuring pain, anxiety, and sleep quality. The study used scales to measure the variables.

The Richard–Campbell Sleep Questionnaire (RCSQ), developed by Richards in 1987, consists of six items assessing sleep depth, sleep latency, frequency of awakenings, wakefulness after sleep onset, overall sleep quality, and environmental noise. The Turkish adaptation was conducted by Karaman Özlü and Özer in 2015. Each item is rated on a 0–100 scale. Scores between 0–25 indicate very poor sleep, while scores between 76–100 reflect very good sleep. The total score is calculated from the first five items; the sixth item (noise level) is not included. Higher scores indicate better sleep quality. The Cronbach's α coefficient of the scale is 0.82 (Karaman Özlü & Özer, 2015; Richards, 1987).

Hospital Anxiety and Depression Scale (HADS) designed by Zigmond and Snaith in 1983 to detect anxiety and depression in outpatient populations, HADS excludes symptoms attributable to physical illness. It contains 14 items divided into two subscales: Anxiety (HADS-A) and Depression

(HADS-D), each with seven items scored 0-3. Subscale scores range from 0 to 21, with the following cutoffs: 0–7= normal, 8-10= mild risk, 11-15= moderate, and ≥ 16 = severe. The Turkish translation was done by Aydemir et al. in 1997 (Aydemir et al., 1997; Zigmond & Snaith, 1983).

Numeric Rating Scale for Pain (NRS) for pain is a 10-cm line anchored by 'no pain' at one end and 'worst imaginable pain' at the other. Patients indicate their pain intensity along the line, which is then scored from 0 to 10, 0-3= mild, 4-6= moderate, and 7-10= severe. The NRS is widely used and has demonstrated high reliability in assessing both postoperative and chronic pain.

Data Analysis

Descriptive statistics (frequency, percentage, mean, standard deviation, and minimum and maximum values) were applied. Spearman's correlation analysis was performed to examine relationships among the scales. A p-value of <0.05 was considered statistically significant.

RESULTS

The patients had a mean age of 49.33 ± 14.06 years (min= 23, max= 76); 43.3% (n= 13) were women and 56.7% (n= 17) were men (Table 1).

Table 1. Sociodemographic characteristics of the patients

	Mean $\pm$ SD (Min-Max)	n	%
Age	49,33 $\pm$ 14,06 (23-76)		
Gender	Female	13	43.3
	Male	17	56.7
Education Level	Elementary School	8	26.7
	Middle School	7	23.3
	High School	6	20.0
	Associate Degree	5	16.7
	Bachelor's Degree	4	13.3

In Table 2, the 30 patients had a mean sleep score of 24.30 ± 14.27 (min= 4, max= 52); a mean anxiety score of 8.86 ± 3.42 (min= 4, max= 18); a mean depression score of 8.26 ± 4.80

(min= 2, max= 18); a combined depression+anxiety mean score of 17.13 ± 7.87 (min= 7, max= 36); and a mean pain score of 3.96 (min= 2, max= 8).

Table 2. Mean total scores obtained by the patients on each scale

Total scores of Scales	Mean $\pm$ SD	Min	Max
The Richard–Campbell Sleep Questionnaire (RCSQ)	24.30 $\pm$ 14.27	4	52
Anxiety (HADS-A)	8.86 $\pm$ 3.42	4	18
Depression (HADS-D)	8.26 $\pm$ 4.80	2	18
Hospital Anxiety and Depression Scale (HADS)	17.13 $\pm$ 7.87	7	36
Numeric Rating Scale for Pain (NRS)	3.96 $\pm$ 1.50	2	8

In Table 3, the correlation coefficients (r) and significance levels among the scales are presented. A moderate negative correlation was found between sleep and anxiety ($r=-0.376$, $p=0.040$), as well as between sleep and depression ($r=-0.466$, $p=0.009$) and between sleep and the combined depression–anxiety score ($r= -0.491$, $p=0.006$). Sleep quality also showed a statistically significant negative correlation with pain ($r -0.645$, $p<0.001$).

Anxiety and depression exhibited a strong positive correlation ($r=0.817$, $p<0.001$), and an even stronger positive correlation was found

between anxiety and the combined depression–anxiety score ($r=0.920$, $p<0.001$). Likewise, depression and the combined depression–anxiety score were very highly correlated ($r=0.970$, $p<0.001$).

The relationships between anxiety and pain ($r=0.054$, $p=0.793$) and between depression and pain ($r=0.172$, $p=0.401$) were not statistically significant. However, a moderate and statistically significant negative correlation was found between the combined depression–anxiety score and pain ($r=-0.468$, $p=0.009$) (Table 3).

Table 3. Relationships among the scales

Mean total scores for the scales	The Richard–Campbell Sleep Questionnaire (RCSQ)	Anxiety (HADS-A)	Depression (HADS-D)	Hospital Anxiety and Depression Scale (HADS)	Numeric Rating Scale for Pain (NRS)
	r p	r p	r p	r p	r p
The Richard–Campbell Sleep Questionnaire (RCSQ)	-	-0.376 0.040*	-0.466 0.009	-0.491 0.006	-0.645 0.000**
Anxiety (HADS-A)		-	0.817 0.000**	0.920 0.000**	0.054 0.793
Depression (HADS-D)			-	0.970 0.000**	0.172 0.401
Hospital Anxiety and Depression Scale (HADS)				-	-0.468 0.009**
Numeric Rating Scale for Pain (NRS)					-

* $p<0.05$; ** $p<0.01$

DISCUSSION

This study examined pain, anxiety, and sleep disturbances in patients undergoing laparoscopic cholecystectomy. Pain is a common and multidimensional phenomenon after surgical procedures, with its intensity and duration varying by individual and type of surgery (Kim et al., 2023). Previous research has shown that 30% to 55% of general surgery patients report moderate to severe pain on the first postoperative day (van Dijk et al., 2021). Such pain reduces patient satisfaction, impairs quality of life, negatively affects social interaction, prolongs hospitalization, and increases both morbidity and mortality (Tosun et al., 2022). In the present study, the mean pain score of the patients was 3.96 ± 1.50 .

Comparable findings have been documented in the literature. Yurddaş and Seyhan Ak (2022) reported a mean first-day postoperative pain score of 4.01 ± 1.75 following laparoscopic surgery, while Tosun et al. (2022) recorded 3.68 ± 1.37 . Yaman Aktaş and Bahadır Yılmaz (2017) found a higher mean pain intensity of 6.82 ± 3.95 . In patients undergoing breast surgery, Gül et al. (2015) reported a first-day pain level of 3.26 ± 1.91 . Similarly, Shoqirat et al. (2019) in Jordan observed a mean worst-pain score of 6.18 ± 3.41 and noted that pain increased with activity. van Dijk et al. (2021) indicated that 26%-38% of patients experienced severe pain on the first postoperative day, which significantly restricted movement. Shrestha et al. (2024) also observed that 84% of patients experienced moderate pain within the first 24 hours after laparoscopic cholecystectomy, with a gradual decline within 48 hours. Collectively, these findings emphasize that inadequately managed acute pain may result in complications, prolonged hospitalization, and an increased risk of chronic pain development. Therefore, systematic assessment and effective management of postoperative pain are essential. Surgical

interventions represent a major source of stress for patients, provoking both anxiety and pain (Yurddaş & Seyhan Ak, 2022). In the present study, the mean Hospital Anxiety and Depression Scale (HADS) anxiety score was 8.86 ± 3.42 , and the mean depression score was 8.36 ± 3.60 , indicating a mild risk of mood disturbance in both domains. Consistent with these findings, Erdağı Oral et al. (2022) and Karaveli Çakır et al. (2024) reported that surgical patients generally experience moderate levels of anxiety. Similarly, Arslanoğlu et al. (2023) identified moderate preoperative anxiety among patients scheduled for laparoscopic cholecystectomy. In addition, Rakesh et al. (2024) found that 61.32% of patients experienced high anxiety before surgery, a rate that decreased significantly to 19.33% postoperatively. The leading causes of preoperative anxiety included concerns about family (91.03%), fear of complications (80.6%), and financial losses (68.86%). Taken together, these findings highlight that surgical procedures impose considerable psychological as well as physical burdens, emphasizing the importance of providing preoperative psychological support.

In the present study, postoperative sleep quality was found to be low, with a mean Richard–Campbell Sleep Questionnaire (RCSQ) score of 24.30 ± 14.27 , indicating that patients overall experienced poor sleep quality. By comparison, Karaveli Çakır et al. (2024) reported a mean RCSQ score of 53.76 ± 22.52 in elective-surgery patients, suggesting a moderate level of sleep quality. Similarly, Erdağı Oral et al. (2022) documented a mean score of 49.61 ± 25.34 among surgical-ward patients; in that cohort, 48% reported sleep disturbances during hospitalization, with 54.1% attributing these problems to pain. Another study found a mean RCSQ score of 53.52 ± 19.79 (median=52; range=8–96) in patients undergoing laparoscopic cholecystectomy, with 77.5% exhibiting moderate sleep quality (Yurddaş & Seyhan Ak, 2022). Para and Uslu (2022) also

reported a mean score of 40.89 ± 14.61 , reflecting low-to-moderate sleep quality. The markedly lower RCSQ score observed in the present study, compared with these earlier findings, suggests that postoperative sleep quality was substantially impaired and that factors such as pain and anxiety may have severely disrupted sleep patterns. These results underscore the importance of nurses' assessing sleep quality in the postoperative period and implementing appropriate interventions to address identified problems.

Pain is among the most common problems following surgical interventions and has a direct impact on both physical and psychological well-being. Consistent with this, Yurddaş and Seyhan Ak (2022) reported that preoperative anxiety increased postoperative pain in patients undergoing laparoscopic cholecystectomy. In contrast, Arslanoğlu et al. (2023) found that preoperative education did not significantly reduce surgical anxiety but was effective in decreasing postoperative pain. Similarly, although Gül et al. (2015) did not identify a significant association between pain and anxiety, they reported a weak positive relationship between anxiety levels and analgesic use.

Anxiety is an intense feeling of fear and worry that arises when individuals perceive a life-threatening situation (Gül et al., 2015; Karaveli Çakır et al., 2024). It is common during surgical processes and can influence patient outcomes. One study reported a mean pre-operative anxiety score of 14.2 ± 6 and showed that this level had negative effects on postoperative sleep quality and overall comfort (Karaveli Çakır et al., 2024). Another study found a significant positive correlation between anxiety levels and sleep problems and observed a significant negative relationship between in-hospital sleep duration and anxiety (Yaman Aktaş & Bahadır Yılmaz, 2017).

Sleep is essential for maintaining physiological and psychological health; while it supports bodily restoration, it also plays a crucial role in reducing stress and anxiety (Para & Uslu, 2022). Postoperative sleep quality is frequently impaired, adversely affecting overall well-being. Erdağı Oral et al. (2022) reported that decreased sleep quality can exacerbate pain and anxiety and prolong hospital stay. Para and Uslu (2022) identified a negative correlation between the Factors Affecting Sleep Pattern Form score and sleep quality, noting that light, room crowding, temperature, and medical devices were the most influential factors. One study demonstrated an inverse association between anxiety and postoperative sleep quality and comfort (Karaveli Çakır et al., 2024).

Consistent with these findings, our study demonstrated statistically significant negative correlations between sleep quality and both anxiety and depression scores, indicating that poorer sleep quality is associated with a higher risk of mood disturbance. These results underscore the strong interrelationship of biopsychosocial factors during the surgical process and highlight the need for a holistic care approach that addresses psychological as well as physiological needs. In particular, assessing pre-operative anxiety levels and providing appropriate support may be effective in managing both sleep quality and postoperative pain levels.

CONCLUSION

The findings of this study show that patients who undergo laparoscopic cholecystectomy experience postoperative pain, anxiety, and sleep problems, and that these three factors are interrelated. Pain, especially during the first 24 hours, negatively affects sleep quality, which in turn is associated with higher anxiety levels. Together, these issues slow recovery and diminish patient satisfaction.

Based on these results, the following actions are recommended:

- Regular pain assessment and individualized pain-management strategies should be implemented throughout the postoperative period.
- Nursing interventions aimed at improving sleep quality such as sleep-hygiene education and environmental adjustments should be planned.
- Psychosocial support programs to reduce anxiety should be offered in both the pre- and postoperative phases.
- A holistic nursing approach that considers the interplay among pain, anxiety, and sleep should be adopted.
- Ongoing training for healthcare professionals should be provided to raise awareness of effective pain, anxiety, and sleep management. Early identification and effective management of pain, anxiety, and sleep disturbances in the postoperative period accelerate recovery and enhance patient satisfaction. Nurses play a pivotal role in this process, and their active involvement is essential for improving the quality of care.

Limitations of the Study

The main limitation of this study is the small sample size of 30 patients. Although laparoscopic cholecystectomy is a commonly performed surgical procedure, this research was designed as a pilot study and conducted with limited time and resources. As a result, the findings should be interpreted with caution and cannot be generalized to other populations. Future studies with larger, multi-center samples are recommended to validate and expand upon these results.

Declaration of Interests: The authors declare that there is no conflict of interest.

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Ethical Considerations: Ethical approval for the study was obtained from the institutional Ethics Committee (Date: 15 November 2024; No: 24). Written informed consent was obtained from all participants, and the study was carried out in accordance with the principles of the Declaration of Helsinki.

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