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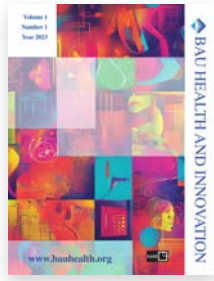

Original Article

Investigation of the Impact of Pre-operative Anxiety Levels on Post-operative Sleep Quality in Surgical Patients

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Abstract

Objectives: This study aims to investigate the impact of pre-operative anxiety levels on sleep quality in patients undergoing surgical procedures.

Methods: The study was conducted between July 01 and August 31, 2023, at an Istanbul training and research hospital. A total of 220 patients aged 18 years and older, who stayed in the hospital for at least 24 h post-surgery and did not use sleep medications, were included. Anxiety levels were assessed using the Amsterdam Pre-operative Anxiety and Information Scale, while sleep quality was evaluated using the Richards-Campbell Sleep Questionnaire. Data analysis was conducted using SPSS 25.0 software.

Results: Among the participants, 50.5% were female, 65.9% were married, 51.8% were employed, and the mean age was 45±10.5 years. The average pre-operative anxiety level was 30.1±17.8, and the average sleep quality score was 15.2±4.16. Correlation analysis demonstrated a strong negative correlation between anxiety and sleep quality ($p=-0.875$, $p<0.001$). Furthermore, employment status and age were found to significantly affect both anxiety levels and sleep quality.

Conclusion: Pre-operative anxiety has a negative impact on sleep quality in patients. Addressing anxiety may contribute to an expedited recovery process post-surgery.

Keywords: Anxiety levels, pre-operative anxiety, sleep quality, surgical patients.

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Surgical procedures are intricate interventions that can induce both physical and psychological stress in patients. Factors such as anticipated pain, fear of anesthesia-related complications, concerns about loss of work capacity, and prolonged fasting contribute to pre-operative anxiety.[1–3] Research by Ruis et al. (2017)[4] indicated that surgical patients commonly experience pre-operative anxiety associated with surgery and anesthesia, whereas Abate et al. (2020)[5] reported that patients who fear complications exhibit pre-operative anxiety levels approximately 4 times higher than those without such fears. High levels of pre-operative anxiety have negative consequences, such as an increased need for analgesia due to increased pain and deterioration in sleep quality. These outcomes are closely related to post-operative sleep disturbance.[6–8] Ayik and Özden (2018)[9] underlined the effectiveness of effective complementary interventions, such as aromatherapy massage, in reducing post-operative problems of pre-operative anxiety. Other studies in the literature have also highlighted that pre-operative anxiety exacerbates sleep disturbances. These findings highlight the importance of addressing pre-operative anxiety to manage surgical

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outcomes and improve patient well-being. Targeted interventions can significantly improve the recovery process and enhance post-operative quality of life.[10,11]

Sleep is a fundamental human need, and its quality can be influenced by various factors, including general health status, pain, anxiety, and environmental conditions such as noise and light.[7,12] During the perioperative period, patients often experience sleep disturbances, which can hinder recovery, exacerbate neurological complications, and increase pain, ultimately diminishing patient satisfaction.[12,13] A systematic review by Lin et al.[14] highlights that perioperative patients are often exposed to sleep disturbances and that surgical anxiety is one of the factors contributing to this problem.

The relationship between surgery and sleep disturbance has been attributed to several physiological mechanisms, including endocrine, autonomic, and inflammatory stress responses. In addition, studies suggest that post-operative cytokines may adversely affect sleep quality.[15] Anxiety and sleep disturbance have a bidirectional relationship, with anxiety exacerbating sleep problems and sleep disturbance appearing to exacerbate anxiety. This cycle can increase patient recovery time and adversely affect patient satisfaction.[6,7,14]

Randomized controlled trials in the literature have reported the effectiveness of pre-operative interventions such as aromatherapy and massage in reducing anxiety and improving sleep quality. One of these studies reported that acupressure significantly reduced anxiety and improved sleep quality after cardiac surgery,[16] while a similar study showed that aromatherapy massage effectively reduced anxiety and improved sleep quality in colorectal surgery patients. These findings highlight the impact of anxiety and sleep-related problems in surgical care.[9]

This study aims to investigate the relationship between pre-operative anxiety levels and post-operative sleep quality. This study aims to contribute to solving the problems that patients may experience sleeping by investigating the effect of anxiety on sleep disturbance in the perioperative period.

Research Questions

Is there a correlation between pre-operative anxiety levels and post-operative sleep quality?

Materials and Methods

Study Design

This research is a descriptive and correlational quantitative study.

Population and Sample

The study population consisted of patients undergoing surgery at the specified hospital. The sample size was determined using the "known population sampling formula" with a 95% confidence interval and a 0.05 margin of error, resulting in 220 patients. The study data were collected between July 01 and August 31, 2023.

Data Collection

Data on participants' characteristics were collected using a patient identification form. Anxiety levels were assessed using the Amsterdam Pre-operative Anxiety and Information Scale, validated in Turkish by Cetinkaya et al. (2019)[17] and Eti Aslan et al. (2020).[18] Sleep quality was measured using the Richards-Campbell Sleep Questionnaire (RCSQ), validated in Turkish by Karaman Ozlu and Ozer (2015).[19]

Patient identification form

This form consists of 10 items aimed at assessing the sociodemographic characteristics of patients.[17–19]

Amsterdam pre-operative anxiety and knowledge scale (APAIS)

Moermann et al.[20] developed this scale. The APAIS is a validated instrument designed to evaluate pre-operative anxiety and the demand for information, encompassing two distinct dimensions: anxiety associated with anesthesia and surgery, and the need for informational support. The scale comprises six items, each rated on a 5-point Likert scale ranging from "none" to "extremely severe." Anxiety related to anesthesia and surgery is quantified through the combined scores of items 1, 2, 4, and 5, whereas the informational demand is assessed using items 3 and 6. The total anxiety score is derived by aggregating the scores of these two subdomains, yielding a range between 6 and 30. Elevated scores signify heightened anxiety levels, rendering the APAIS a critical tool for the systematic identification and management of pre-operative psychological distress.[17,18]

The RCSQ

The scale comprises six items rated on a continuum from 0 to 100; however, the sixth item is excluded from the scoring calculation. Higher overall scores on the scale reflect superior sleep quality, establishing the RCSQ as a reliable instrument for evaluating and monitoring sleep in both clinical practice and research contexts.[19]

Inclusion Criteria

Patients aged 18 and above who consented to participate. Patients who stayed in the hospital for at least 24 h post-surgery. Patients who did not use sleep medication.

Data Analysis

Data were analyzed using SPSS Statistics 25.0. Descriptive statistical methods (frequency, percentage, minimum-maximum values, median, mean, and standard deviation) were employed. Normality was assessed using the Kolmogorov–Smirnov test, revealing that variables did not follow a normal distribution. Non-parametric tests were applied, with the Mann–Whitney U Test used for two-group comparisons. Spearman correlation was conducted to examine relationships between variables.

Ethical Considerations

Ethical approval was obtained from a training and research hospital in Istanbul on June 21, 2023 (approval number: 116). Written informed consent was obtained from all participants before data collection. This study was conducted in accordance with the principles outlined in the Declaration of Helsinki.

Results

Of the participants, 50.5% were identified as female, 65.9% were married, 51.8% were engaged in employment, and the mean age was recorded as 45±10.5 years. Importantly, 64.1% of the participants indicated no prior history of surgical procedures (Table 1).

The Cronbach's Alpha coefficient was computed to evaluate the internal consistency of the scales employed in this study. The results revealed a Cronbach's Alpha coefficient of 0.776 for the Sleep Scale and 0.774 for the Anxiety Scale, indicating that both scales exhibit an acceptable level of reliability.

Subsequently, the relationships between the patients' demographic data and the scales were analyzed. The mean pre-operative anxiety score was 30.1±17.8, whereas the mean post-operative sleep score was 15.2±4.16. A Spearman correlation analysis conducted between the two scales demonstrated a strong negative correlation between the total anxiety score and the total sleep score (p=-0.875, p<0.001). Statistically significant associations were found between the total anxiety and sleep scores when considering participants' employment status and age; however, no significant differences were observed between the scales and other demographic variables (Table 2).

Table 1. Distribution of patients by demographic characteristics (n=220)

Variable	n	%
Gender		
Female	111	50.5
Male	109	49.5
Marital status		
Single	75	34.1
Married	145	65.9
Employment status		
Employed	114	51.8
Unemployed	106	48.2
Previous surgery		
Yes	79	35.9
No	141	64.1
Age (mean)	45±10.5	

Discussion

This study was conducted to investigate the relationship between pre-operative anxiety levels and post-operative sleep quality. The findings suggest that anxiety levels have a significant impact on sleep quality. In addition, the effects of demographic variables on anxiety and sleep quality were examined, and the results were discussed in the context of existing literature.

Table 2. Correlation between variables and scales (n=220)

Variable	Scale	U	df	p
Gender	Amsterdam Pre-operative Anxiety and Knowledge Scale	5823	218	0.631
	Richards-Campbell Sleep Questionnaire	5960	218	0.850
Marital status	Amsterdam Pre-operative Anxiety and Knowledge Scale	5306	218	0.770
	Richards-Campbell Sleep Questionnaire	5186	218	0.574
Employment status	Amsterdam Pre-operative Anxiety and Knowledge Scale	4733	218	0.006*
	Richards-Campbell Sleep Questionnaire	5095	218	0.044*
Previous surgery status	Amsterdam Pre-operative Anxiety and Knowledge Scale	4896	218	0.137
	Richards-Campbell Sleep Questionnaire	4850	218	0.111
Age	Amsterdam Pre-operative Anxiety and Knowledge Scale	20031**		0.001*
	Richards-Campbell Sleep Questionnaire	0.00**		0.001*

*: p<0.005 indicates statistical significance, **: Wilcoxon W test. U: Mann–Whitney U test results, df: Degrees of freedom.

According to the study results, a strong negative correlation was found between pre-operative anxiety and post-operative sleep quality. This finding corroborates previous studies in the literature that indicate anxiety, through its effects on the sympathetic nervous system, may disrupt sleep patterns.[21,22] A study conducted in 12 hospitals across China involving 997 patients undergoing elective surgery found that higher levels of pre-operative anxiety were associated with poorer post-operative sleep quality.[23] Another prospective cohort study involving 107 patients undergoing total joint arthroplasty demonstrated that 31% of patients experienced poor sleep quality at 4, 8, and 12 weeks following surgery.[24] In a study by Gu et al. (2023),[6] it was reported that patients with pre-operative anxiety experienced worse perioperative sleep quality compared to those without pre-operative anxiety. These findings underscore the importance of anxiety management in the pre-operative period for both psychological well-being and post-operative recovery.

An analysis of the demographic data of the participants revealed that age and employment status had a significant effect on both anxiety and sleep quality. It was found that as age increased, anxiety levels were higher and sleep quality was worse, consistent with other studies in the literature. Gök and Kabu Hergül (2020) reported that advanced age and poor economic status were associated with elevated anxiety levels.[25] Employment status emerged as a factor that directly influences work and life-related stress. In this study, participants who were employed exhibited significantly higher anxiety scores and poorer sleep quality compared to their unemployed counterparts. These findings suggest that stressors, such as work-related pressures and financial responsibilities, may elevate anxiety levels during the pre-operative period, thereby negatively impacting sleep patterns.

No statistically significant relationship was found between anxiety and sleep quality about other demographic variables (gender, marital status, and previous surgery history) in this study. These results suggest that the factors examined exert a limited influence on psychological and physiological outcomes, and therefore have a less pronounced effect on anxiety and sleep quality. Similarly, some studies in the literature have indicated that the impact of gender and marital status on pre-operative anxiety and sleep quality is relatively limited.[26,27] A similar study conducted by Karaveli Çakir et al.[28] found that patients with elevated anxiety levels before surgery experienced lower sleep quality and comfort postoperatively. Considering the significant impact of anxiety on sleep quality and comfort, it is recommended that patient anxiety levels be assessed in the pre-operative phase, followed by the implementation of targeted nursing interventions based on these evaluations.

Conclusion

This study established a strong negative correlation between pre-operative anxiety and post-operative sleep quality. Based on these findings, patients with elevated pre-operative anxiety must receive psychological support and anxiety management. Pre-operative preparation programs have the potential to enhance sleep quality and expedite the recovery process. Therefore, it is recommended that future research, involving larger sample sizes, further explore the relationship between anxiety and sleep in greater depth to gain more comprehensive insights.

Patients should undergo a thorough assessment to identify possible anxiety and sleep disorders, and those at particularly high risk should be identified. It is crucial to develop and implement tailored interventions for both the pre-operative and post-operative periods. It is also important to provide support to help patients recognize interventions appropriate to their individual needs. Experimental studies are recommended to evaluate the effectiveness of non-pharmacological interventions such as relaxation and breathing exercises aimed at reducing anxiety and improving sleep quality.

Disclosures

Ethics Committee Approval: The study was approved by the İstanbul Sancaktepe Şehit Prof.Dr. İlhan Varank Training and Research Hospital Non-intervantional Research Ethics Committee (no: 116, date: 21/06/2023).

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References

1. Eberhart L, Aust H, Schuster M, Sturm T, Gehling M, Euteneuer F, et al. Preoperative anxiety in adults - A cross-sectional study on specific fears and risk factors. BMC Psychiatry 2020;20(1):140.
2. Friedrich S, Reis S, Meybohm P, Kranke P. Preoperative anxiety. Curr Opin Anaesthesiol 2022;35(6):674–8.

3. İster G, Hacidursunoğlu Erbaş D, Eti Aslan F. The effect of prolonged fasting before surgery on pain and anxiety. J Perianesth Nurs 2024:S1089-9472(24)00202-8.
4. Ruis C, Wajer IH, Robe P, van Zandvoort M. Anxiety in the preoperative phase of awake brain tumor surgery. Clin Neurol Neurosurg 2017;157:7–10.
5. Abate SM, Chekol YA, Basu B. Global prevalence and determinants of preoperative anxiety among surgical patients: A systematic review and meta-analysis. Int J Surg Open 2020;25:6–16.
6. Gu X, Zhang Y, Wei W, Zhu J. Effects of preoperative anxiety on postoperative outcomes and sleep quality in patients undergoing laparoscopic gynecological surgery. J Clin Med 2023;12(5):1835.
7. Okyar P, Şen Tepe Ç, Durat G. The effect of pre-operative anxiety on sleep quality. [Article in Turkish] Sakarya Univ Holist Health J 2022;5(2):112–21.
8. Yu J, Zhang Y, Yu T, Mi W, Yao S, Wang Z, et al. Preoperative anxiety in chinese adult patients undergoing elective surgeries: A multicenter cross-sectional study. World J Surg 2022;46(12):2927–38.
9. Ayik C, Özden D. The effects of preoperative aromatherapy massage on anxiety and sleep quality of colorectal surgery patients: A randomized controlled study. Complement Ther Med 2018;36:93–9.
10. Yilmaz M, Sezer H, Gürler H, Bekar M. Predictors of preoperative anxiety in surgical inpatients. J Clin Nurs 2012;21(7-8):956–64.
11. Batista dos Santos MM, Amado Martins JC, Nunes Oliveira LM. Anxiety, depression and stress in the preoperative surgical patient. Rev Enferm Refer 2014;4(3):7–15.
12. Rampes S, Ma K, Divecha YA, Alam A, Ma D. Postoperative sleep disorders and their potential impacts on surgical outcomes. J Biomed Res 2019;34(4):271–80.
13. He E, Dong Y, Jia H, Yu L. Relationship of sleep disturbance and postoperative delirium: A systematic review and meta-analysis. Gland Surg 2022;11(7):1192–203.
14. Lin D, Huang X, Sun Y, Wei C, Wu A. Perioperative sleep disorder: A review. Front Med (Lausanne) 2021;8:640416.
15. Sipilä RM, Kalso EA. Sleep well and recover faster with less pain-A narrative review on sleep in the perioperative period. J Clin Med 2021;10(9):2000.
16. Aygin D, Şen S. Acupressure on anxiety and sleep quality after cardiac surgery: A randomized controlled trial. J Perianesth Nurs 2019;34(6):1222–31.
17. Çetinkaya F, Kavuran E, Ünal Aslan KS. Validity and reliability of the Amsterdam preoperative anxiety and information scale in the Turkish population. Turk J Med Sci 2019;49(1):178–83.
18. Eti Aslan F, Çınar F, Azizoğlu H, Korkmaz E. Amsterdam preoperative anxiety and knowledge scale: Turkish validity and reliability study. Innov J Med Health Sci 2020;10(4):955–63.
19. Karaman Özlü Z, Özer N. Richard-Campbell sleep questionnaire validity and reliability study. J Turk Sleep Med 2015;2(1):29–32.
20. Moerman N, van Dam FS, Muller MJ, Oosting H. The Amsterdam preoperative anxiety and information scale (APAIS). Anesth Analg 1996;82(3):445–51.
21. Hur MH, Song JA, Lee J, Lee MS. Aromatherapy for stress reduction in healthy adults: A systematic review and meta-analysis of randomized clinical trials. Maturitas 2014;79(4):362–9.
22. Lambrini K, Ouzounakis P, Papathanassiou I, Koukourikos K, Tsaras K, Iliadis C, et al. Sleep and health: Role of dopamine. In: Dopamine, Health Disease. London: IntechOpen; 2018. p. 31.
23. Li XR, Zhang WH, Williams JP, Li T, Yuan JH, Du Y, et al. A multicenter survey of perioperative anxiety in China: Pre- and postoperative associations. J Psychosom Res 2021;147:110528.
24. Wang Y, Liu Y, Li X, Lv Q, Xia Q, Wang X, et al. Prospective assessment and risk factors of sleep disturbances in total hip and knee arthroplasty based on an enhanced recovery after surgery concept. Sleep Breath 2021;25(3):1231–7.
25. Gök F, Kabu Hergül F. Determination of level of anxiety and depression of patients hospitalized in surgery clinics. J Adv Res Health Sci 2020;3(3):195–206.
26. Önler E, Yılmaz A. The sleep quality of the patients in surgical units. [Article in Turkish] Istanbul Univ Flor Nightingale Nurs J 2008;16(62):114–21.
27. Para E, Uslu Y. Postoperative sleep quality and affecting factors sleep patterns in surgical patients. CBU-SBED 2022;9(4):443–450.
28. Karaveli Çakır S, Demiryürek SO, Çelik Demiryürek S. The effect of preoperative anxiety level on postoperative sleep quality and comfort level. [Article in Turkish] Health Care Acad J 2024;11(1):42–50.