

The Impact of Preoperative Sleep Disorders on Postoperative Outcomes

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Abstract: Preoperative sleep disorders represent a prevalent and modifiable risk factor that has garnered significant attention due to their multifaceted impact on postoperative recovery. Substantial evidence indicates that poor preoperative sleep quality is strongly associated with increased acute postoperative pain, cognitive impairment, a higher incidence of delirium, and worsened mental health outcomes. This review critically examines recent literature on the relationship between preoperative sleep disorders and postoperative outcomes, including pain control, cognitive recovery, delirium risk, and other adverse events. We incorporate evidence from prospective cohort studies, randomized controlled trials, and animal experiments. By synthesizing findings across studies, this article elucidates the differential effects of various sleep disorder types—such as insomnia symptoms, sleep continuity disturbances, and sleep-related breathing disorders—on postoperative recovery. We also explore potential underlying biological mechanisms and discuss emerging intervention strategies. Furthermore, the review highlights methodological limitations in current research regarding sample selection, assessment tools, and intervention approaches, and suggests directions for future research, emphasizing the critical importance of individualized perioperative sleep management. This review aims to inform clinical practice by facilitating the identification and management of preoperative sleep disorders to optimize the quality of postoperative recovery and patients' long-term quality of life.

Keywords: Preoperative sleep disorders, postoperative outcomes, quality of recovery, perioperative medicine

Introduction

Sleep is a fundamental biological process essential for maintaining physiological and psychological homeostasis. Its quality directly influences immune function, pain perception, cognitive performance, and emotional regulation. Patients in the perioperative period frequently experience sleep disturbances due to factors such as anxiety, pain, environmental changes, and surgical stress. Preoperative sleep disorders not only impede the pace and efficacy of postoperative recovery but also elevate the risk of complications, particularly among elderly patients. With advancements in surgical and anesthetic techniques, comprehensive perioperative management has received increasing emphasis, positioning

the assessment and improvement of preoperative sleep quality as a crucial step in enhancing postoperative outcomes.

Although numerous studies have established a correlation between preoperative sleep disorders and postoperative recovery, the specific mechanisms and efficacy of interventions targeting these sleep issues remain incompletely understood. Preoperative sleep disturbances may influence postoperative pain perception, cognitive function, and emotional state through multiple pathways, thereby profoundly impacting overall recovery. Therefore, a systematic review of the relationship between preoperative sleep disorders and postoperative outcomes is of great significance for guiding clinical risk assessment and developing personalized intervention strategies.

This article aims to analyze the impact of preoperative sleep disorders on postoperative pain control, cognitive recovery, delirium incidence, and other adverse outcomes based on recent high-quality literature. It compares findings and interpretations across studies, explores potential physiological mechanisms and interventions, critically assesses the limitations of existing research, and proposes future directions to provide.

Theoretical support and practical guidance for perioperative sleep management.

The Relationship Between Preoperative Sleep Disorders and Postoperative Pain Control

Effective postoperative pain management is a cornerstone of perioperative care, and preoperative sleep disorders are increasingly recognized as a significant factor influencing postoperative pain experience and analgesic requirements. Niklasson et al. ^[1] conducted a systematic review and meta-analysis encompassing 29 cohort studies (total n=16,104) and found that preoperative insomnia symptoms were significantly associated with moderate-to-severe pain intensity on the first postoperative day (OR=2.69, 95% CI: 2.03–3.57, $p<0.0001$). This finding establishes preoperative insomnia as an independent risk factor for acute postoperative pain. Furthermore, insomnia was correlated with increased analgesic consumption, potentially delaying the recovery process.

Wilson et al. ^[2] further explored the interrelationship between reduced preoperative physical activity and postoperative pain, revealing that patients' perceived decrease in physical activity level exacerbated sleep disturbances and subsequently influenced postoperative pain. This suggests that maintaining or increasing preoperative physical activity may hold promise as an intervention to improve sleep quality and mitigate postoperative pain.

The randomized controlled PROSAP-A trial, designed by Bjurström et al. ^[3], aims to evaluate the impact of cognitive behavioral therapy for insomnia (CBT-I) on postoperative pain control. This study seeks to determine whether sleep intervention can effectively reduce postoperative pain intensity and analgesic demand, thereby providing high-level evidence to guide clinical practice.

In summary, preoperative sleep disorders, particularly insomnia, are closely linked to exacerbated postoperative pain. This relationship is further mediated through effects on physical activity and psychological state. Future research should focus on the differential impacts of various sleep disorder types on pain and the development of individualized intervention strategies.

The Impact of Preoperative Sleep Disorders on Postoperative Cognitive Function and Delirium

Postoperative cognitive dysfunction (POCD) and postoperative delirium (POD) are common and serious complications in the perioperative period, with a notably higher incidence in elderly patients. Accumulating evidence confirms that preoperative sleep disorders are significant risk factors for both POCD and POD.

In a study of 300 patients undergoing elective surgery, Mashayekhi et al. ^[4] found that poor preoperative sleep quality was significantly correlated with delirium symptoms ($r=0.374$, $p<0.001$). Patients with sleep disorders also exhibited lower scores on cognitive function tests (MMSE). A retrospective cohort study by Guo et al. ^[5] involving 489 elderly non-cardiac surgery patients demonstrated a significantly higher incidence of POD in the preoperative sleep disorder group compared to the non-sleep disorder group (17.0% vs. 6.2%, $p=0.023$). Preoperative sleep disorders were identified as an independent risk factor for POD (OR=3.03, 95% CI: 1.09–9.52, $p=0.034$).

Additionally, animal experiments by Wen et al. ^[6] revealed that preoperative sleep deprivation exacerbated postoperative neuroinflammation, promoting microglial M1 polarization and impairing the BDNF-TrkB signaling pathway, ultimately leading to cognitive and emotional deficits. The administration of esketamine was shown to reverse these pathological changes, suggesting that sleep disturbances affect postoperative brain function through inflammatory and neuroplasticity mechanisms.

A prospective cohort study by Wang et al. ^[7] further indicated that patients with preoperative sleep disorders experienced significant delays in the recovery of psychomotor function immediately following general anesthesia (within 30 minutes), highlighting the impact of preoperative sleep quality on the awakening process and early cognitive recovery.

In conclusion, preoperative sleep disorders adversely affect postoperative cognitive function and increase the risk of delirium through multiple neurobiological mechanisms. These findings underscore the importance of assessing and improving sleep quality during the perioperative period to prevent neuropsychiatric complications.

The Correlation Between Preoperative Sleep Disorders and Other Postoperative Adverse Outcomes

Beyond pain and cognitive impairment, preoperative sleep disorders are

closely linked to a wider range of postoperative adverse outcomes. A review by Guo et al. ^[5] focusing on patients aged ≥ 65 years indicated that perioperative sleep disturbances are highly prevalent and associated with delayed recovery, increased complications, prolonged hospital stays, and emotional disorders such as anxiety and depression.

Analyzing data from the large China Surgery and Anesthesia Cohort (CSAC, $n=14,129$), Chen et al. ^[8] found that preoperative sleep disorders were significantly associated with various in-hospital and post-discharge adverse events. This association was particularly strong for moderate-to-severe sleep disturbances and the development of long-term depressive symptoms post-surgery, indicating a profound impact on overall patient prognosis.

Coronado et al. ^[9] investigated the combined effect of preoperative sleep disturbances and depression, reporting that patients with both conditions had significantly greater functional impairment and higher pain scores at 12 months postoperatively compared to those with either condition alone or neither. This emphasizes the interactive detrimental effects of psychological health and sleep quality on long-term recovery.

Furthermore, the animal study by Wen et al. ^[6] suggests that preoperative sleep disturbances impact postoperative emotional and cognitive function by modulating neuroinflammation and neuroplasticity, revealing potential targets for clinical intervention.

In summary, preoperative sleep disorders exert a broad negative influence on postoperative recovery, encompassing emotional health, functional recovery, and the incidence of various adverse events. This warrants comprehensive assessment of sleep and psychological status in clinical practice and calls for implementation of multimodal management strategies.

Assessment Methods and Intervention Strategies for Preoperative Sleep Disorders

Accurate assessment of preoperative sleep disorders is a prerequisite for developing effective interventions. Current research primarily employs subjective scales, such as the Pittsburgh Sleep Quality Index (PSQI) and Insomnia Severity Index (ISI), alongside objective measures like polysomnography and actigraphy. Guo et al. ^[5] emphasized that a combination of subjective and objective assessment methods provides a more comprehensive understanding of a patient's sleep status, which is particularly crucial in elderly populations.

Regarding interventions, the PROSAP-A randomized controlled trial by Bjurström et al. ^[3] utilizes cognitive behavioral therapy for insomnia (CBT-I) compared to sleep education, aiming to validate the effect of preoperative insomnia improvement on postoperative pain and recovery. This represents a cutting-edge approach in non-pharmacological sleep intervention.

Wilson et al. ^[2] proposed that maintaining or increasing preoperative physical activity levels could help improve sleep quality and indirectly alleviate post-

operative pain, positioning exercise as a potential adjunctive intervention.

Animal research by Wen et al. ^[6] offers insights into pharmacological strategies, demonstrating that esketamine can ameliorate postoperative brain dysfunction by modulating neuroinflammation and the BDNF-TrkB pathway, indicating its potential for future clinical translation.

Guo et al. ^[5] also highlighted the importance of environmental adjustments, psychological interventions, and pharmacological treatments (e.g., melatonin, dexmedetomidine) in perioperative sleep management, advocating for the establishment of standardized assessment and treatment protocols.

In conclusion, the assessment of preoperative sleep disorders should be multidimensional and individualized. Future research should prioritize the optimization of intervention protocols and the rigorous validation of their clinical benefits.

Limitations of Current Research and Future Directions

Despite existing evidence linking preoperative sleep disorders to various postoperative outcomes, several limitations persist. Firstly, most studies are observational in design, preventing definitive conclusions about causality. Significant heterogeneity in sample sizes and patient populations also limits the generalizability of findings ^[1, 4, 5]. Secondly, definitions and assessment standards for sleep disorders lack uniformity, and discrepancies between subjective and objective measures hinder cross-study comparisons and data integration ^[8, 10]. Furthermore, intervention studies are scarce, often focus on a single dimension, and lack long-term follow-up and multicenter validation ^[3].

Future research should prioritize well-designed randomized controlled trials to systematically evaluate the impact of preoperative sleep improvement on multiple postoperative outcomes. Integrating biomarker assays and neuroimaging techniques will be crucial for elucidating underlying mechanisms ^[3, 6]. Concurrently, attention should be paid to developing individualized sleep management strategies tailored to different surgical types, age groups, and patients with comorbidities, fostering multidisciplinary collaboration to achieve precision in perioperative sleep intervention.

Moreover, the integration of digital health technologies for convenient sleep monitoring and remote intervention platforms holds promise for revolutionizing clinical practice, ultimately enhancing patient experience and treatment outcomes.

Conclusion and Outlook

In summary, preoperative sleep disorders constitute a significant and modifiable perioperative risk factor that substantially impacts postoperative pain control, cognitive recovery, delirium incidence, and a range of other adverse outcomes. Systematic reviews and large-scale cohort studies consistently demonstrate that insomnia symptoms and impaired sleep continuity are closely associat-

ed with heightened postoperative pain. Preoperative sleep quality is a key predictor of postoperative cognitive impairment and delirium, and sleep disorders are also linked to postoperative emotional disturbances and poor functional recovery. Animal studies have further uncovered that preoperative sleep disruptions impair postoperative brain function via neuroinflammatory and impaired neuroplasticity pathways, providing a theoretical foundation for pharmacological interventions.

Currently, the assessment of preoperative sleep disorders relies heavily on subjective scales and lacks standardization, while intervention research is still in its early stages. Future efforts should focus on conducting multicenter, large-sample randomized controlled trials to explore the comprehensive effects of interventions like CBT-I, exercise, and pharmacotherapy. These should be coupled with in-depth mechanistic studies incorporating biomarkers. The application of digital health technologies will also provide novel tools for sleep monitoring and intervention, advancing the field of individualized perioperative sleep management.

In clinical practice, it is essential to prioritize the screening and management of preoperative sleep quality, especially in elderly and high-risk patients, to optimize postoperative recovery and reduce complication rates through multimodal care. Future research must emphasize precise diagnosis, mechanistic exploration, and multidisciplinary collaboration to advance the management of perioperative sleep disorders, thereby improving overall patient prognosis and quality of life.

Ultimately, the identification and addressing of preoperative sleep disorders are pivotal for enhancing the quality of perioperative recovery. This goal carries significant clinical and societal importance and warrants sustained attention and in-depth investigation.

Declarations

Ethics approval and consent to participate

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Consent for publication

Not applicable.

Availability of data and materials

Not applicable.

Competing interests

The author declares that there are no competing interests.

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BALin is the sole author of this manuscript and was responsible for all aspects of the work, including conceptualization, literature review, writing, and final approval.

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References

- [1] Niklasson, B., et al. The relationship between preoperative sleep disturbance and acute postoperative pain control: A systematic review and meta-analysis. *Journal of Clinical Anesthesia*, 2023, 85: 111045.
- [2] Wilson, R. A., et al. Preoperative decreased physical activity is associated with greater postoperative pain: the mediating role of preoperative sleep disturbance. *Pain Medicine*, 2022, 23(5): 1001-1010.
- [3] Bjurström, M. F., et al. Randomised, controlled clinical trial evaluating the effects of preoperative insomnia treatment on postoperative pain control and recovery: a protocol for the Promoting Sleep to Alleviate Pain-Arthroplasty (PROSAP-A) trial. *BMJ Open*, 2023, 13(2): e069845.
- [4] Mashayekhi, M., et al. Association Between Preoperative Sleep Disturbance and Postoperative Delirium in Adults Undergoing Elective Surgery. *Anesthesia & Analgesia*, 2024, 138(1): 150-158.
- [5] Guo, Y., et al. Association Between Preoperative Sleep Disturbance and Postoperative Delirium in Elderly: A Retrospective Cohort Study. *BMC Geriatrics*, 2023, 23(1): 456.
- [6] Wen, J., et al. Esketamine Prevents Postoperative Emotional and Cognitive Dysfunction by Suppressing Microglial M1 Polarization and Regulating the BDNF-TrkB Pathway in Ageing Rats with Preoperative Sleep Disturbance. *CNS Neuroscience & Therapeutics*, 2024, 30(1): e14565.
- [7] Wang, L., et al. Association between preoperative sleep disturbance and psychomotor recovery profiles after general anesthesia in day surgery: a prospective cohort study. *Journal of Clinical Monitoring and Computing*, 2023, 37(2): 567-575.
- [8] Chen, S., et al. Associations of preoperative sleep disturbance with intraoperative and postoperative adverse outcomes among Chinese surgical patients: evidence from the China surgery and anesthesia cohort (CSAC). *Sleep Medicine*, 2024, 115: 45-53.
- [9] Coronado, R. A., et al. The Combined Influence of Sleep Disturbance and Depression on 12-month Outcomes After Lumbar Spine Surgery. *The Spine Journal*, 2023, 23(4): 589-598.
- [10] Lee, K. H., et al. Perioperative sleep disturbances in older adults: a scoping review of epidemiology and treatment. *Current Opinion in Anaesthesiology*, 2023, 36(1): 60-67.