Research Status of Influencing Factors of Sleep Complaints at Home and Abroad: Postprint

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Abstract

This article reviews the overview, influencing factors, and assessment tools for sleep complaints, aiming to raise awareness among healthcare professionals, reduce the risk of sleep complaints, and provide a reference for related research.

Full Text

Preamble

Abstract

This paper reviews domestic and international research on the overview, influencing factors, and assessment tools of sleep complaints, aiming to raise awareness among healthcare professionals regarding sleep complaints, reduce the risk of their occurrence, and provide a reference basis for related research development.

Keywords: sleep complaints; sleep quality; fatigue; insomnia; assessment

1 Overview of Sleep Complaints

Sleep complaints, also known as sleep-related complaints, were first mentioned by Erwin et al. in the *Archives of General Psychiatry* in 1970, though currently there is no unified, standardized concept. Sleep complaints represent a form of self-reported sleep problems that indicate underlying health issues. Koffel et al. proposed that definitions of sleep complaints must include two distinct dimensions: insomnia and fatigue. Miles categorized individuals with

mild sleep complaints based on sleep questionnaire and wakefulness assessment scores, while persistent sleep complaints or multiple simultaneous complaints were defined as moderate, and high-frequency sleep complaints with excessive daytime sleepiness as severe. Research indicates that sleep complaints are associated with depressive symptoms, mental distress, and increased mortality risk. Long-term untreated sleep complaints increase the likelihood of physical and mental health problems, making early identification and intervention essential to prevent deterioration and reduce adverse events.

Sleep complaints are relatively common, with insomnia being the most frequent, followed by excessive daytime sleepiness and abnormal nocturnal events. Restless legs syndrome is a common complaint among middle-aged populations. Prevalence varies by region. In New Zealand, 31.6% of adults complain of insomnia, with 26.1% reporting sleep complaints all or most of the time, and 34.1% complaining of daytime fatigue. In Austria, 22.2% of individuals experience high-frequency sleep complaints and excessive daytime sleepiness. In Georgia, 16% of the population has sleep disorders, with 10% reporting multiple sleep complaints. In China, approximately 38.2% of elderly individuals experience poor sleep quality, with sleep complaint prevalence reaching 41.2% among older adults. Among Chinese college students, the rate of poor sleep quality is 39.5%, with lower-grade students more prone to sleep complaints than higher-grade students. Moderate sleep complaints significantly impact the main geriatric conditions affecting 41.2% of elderly individuals. When individuals experience four types of sleep complaints—excessive daytime sleepiness, insomnia, abnormal movements or behaviors during sleep, or inability to sleep at desired times —medical help should be sought.

2 Influencing Factors

Physical Activity: Higher levels of physical activity are associated with fewer sleep complaints. Physical activity is widely recognized as a lifestyle habit that promotes better sleep by elevating body temperature and increasing metabolic expenditure, thereby triggering a stronger need for sleep. Research demonstrates that improvements in maximal oxygen uptake correlate with better sleep status. Physical activity enhances cardiopulmonary function, producing positive changes in maximal oxygen uptake that reduce sleep problem severity. Over time, increased physical activity corresponds with decreased sleep complaints.

Fatigue: Fatigue can be categorized as emotional or physical, and both types correlate closely with sleep complaints. Emotional fatigue, such as negative psychological distress from depression and anxiety, relates to sleep problems. Individuals often internalize these emotions, triggering physiological arousal before and during sleep that leads to insomnia. Physical fatigue also affects sleep complaints, as its severity influences sleep recovery quality. Lower fatigue levels enable better physical restoration from sleep, resulting in fewer complaints.

Disease: Patients with various diseases commonly report sleep complaints, with

types varying by condition. Research identifies depression and anxiety as the most common risk factors for sleep complaints. Patients with mental health conditions such as post-traumatic stress disorder, anxiety, and depression exhibit poor sleep and sleepiness, positively correlating with sleep complaints. Patients with stable paranoid schizophrenia experience lower sleep efficiency and reduced slow-wave sleep compared to healthy populations, with erroneous subjective perception of their own sleep leading to frequent complaints. Chronic pain patients also report sleep complaints, particularly insomnia and fatigue. Obesity correlates with shortened sleep duration and may increase sleep-related complaints. Beyond single conditions, research shows that individuals with multiple long-term, complex health issues requiring continuous treatment report sleep complaints more frequently. Higher comorbidity correlates with increased frequency of expressed sleep complaints, likely related to actual disease effects, symptom physiology, medication side effects, and other primary sleep disorders.

Diet: Unhealthy dietary habits affect sleep quality and increase sleep complaint risk. Evening consumption of caffeinated beverages (sodas, coffee, tea) stimulates nerves and causes insomnia. Alcohol consumption prolongs sleep onset, increases sleep fragmentation, and reduces total sleep length, making sleep complaints common among alcohol-dependent patients. Smoking also significantly correlates with sleep complaints, as nicotine stimulates neurotransmitter release that regulates sleep-wake cycles, while acute nighttime withdrawal produces unpleasant physiological symptoms that disrupt sleep.

Education Level and Social Class: Educational attainment and social class may influence sleep pattern changes. Lower education levels may limit personal development and career opportunities, reducing access to better employment and wages. Individuals in lower social classes experience increased stress, leading to sleep problems and complaints. Bus drivers, nurses, and police officers frequently work irregular shifts, causing sleep disturbances and significantly increasing sleep disorder and complaint frequency. Interestingly, when shift workers have higher education levels and social class, their risk for sleep problems and complaints increases, possibly due to greater perceived quality-of-life loss.

Gender: Sleep complaints are more common in women than men, related to unique female physiological and pathological mechanisms. Estrogen levels fluctuate significantly during menstruation, pregnancy, and menopause, affecting neurotransmitters and hormones related to sleep and increasing insomnia risk. A review on gender differences in insomnia confirms higher risk among women across all ages, with a consistent, progressive trend unaffected by insomnia criteria, frequency, or duration.

Chronotype Differences: Chronotype differences reflect preferences in daily activity timing, categorized as morning type (early sleep, early rise) or evening type (late sleep, late rise). Research indicates evening types experience poorer sleep quality than morning types and complain more frequently. This may occur because evening types have shorter circadian cycles, leading to stronger sleep inertia experiences and higher morning sleepiness levels.

Social Support: Better social support correlates with fewer sleep complaints. Family and social support represent important determinants of sleep quality. Higher support from partners, family, and friends reduces the risk of complaining about insufficient sleep and short sleep duration. Maintaining good relationships with relatives and friends and having supportive social connections may serve as potential measures to maintain good sleep quality and effectively reduce sleep complaint frequency.

Light Exposure: Daytime light exposure benefits good sleep, while excessive nighttime light suppresses melatonin secretion, increasing sleep awakenings. Research shows natural daylight increases circadian rhythm amplitude, increasing sleep duration with changing photoperiods, enhancing daytime activity, and thereby obtaining better nighttime sleep.

Geographical Differences: Sleep complaints relate to geographical variation. Different countries, regions, and latitudes show varying prevalence of sleep disorders. A U.S. state-level study on geographical differences suggests that factors contributing to regional variations in sleep disorders may include race or ethnicity, healthcare access, and body mass index.

Seasonality: Research on seasonality and sleep complaints indicates that individuals highly affected by seasonal changes (high seasonality) have slightly shorter sleep duration than those with moderate or low seasonality. The lack of nighttime sleep in high seasonality populations creates greater subjective sleep needs, leading to more frequent complaints. Additionally, across different seasons, sleep duration and quality vary among high, moderate, and low seasonality groups, further influencing sleep complaint frequency.

3 Assessment Tools for Sleep Complaints

Epworth Sleepiness Scale (ESS): Developed by Johns in 1991, the ESS measures daytime sleepiness through eight items scored from 0 (“never doze”) to 3 (“high likelihood of dozing”), with total scores ranging 0-24. Healthy individuals average approximately 4-5 points, with scores below 10 considered normal, 10-15 indicating mild to moderate daytime sleepiness, and above 15 suggesting severe sleepiness, sleep apnea, or narcolepsy. The ESS has become an internationally recognized, clinically useful tool for assessing subjective sleepiness and has been applied to evaluate sleep complaints in breast cancer patients.

Pittsburgh Sleep Quality Index (PSQI): Developed by Buysse et al. in 1989, the PSQI is a self-rated questionnaire assessing sleep quality. It comprises 19 self-evaluation items forming seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, sleep medication use, and daytime dysfunction. Each component scores 0-3, with the sum producing a global sleep quality index (0-21), where higher scores indicate worse sleep quality and scores above 5 indicate sleep disturbance. The PSQI has been used to assess subjective sleep complaints in college students, elderly individuals, and police officers.

Karolinska Sleepiness Scale (KSS): Developed by Akerstedt et al. in 1990 for clinical assessment of subjective sleepiness, the KSS uses a 9-point scale from 1=extremely alert to 9=very sleepy, great effort to stay awake, and fighting sleep. The scale measures sleep complaints in general populations.

4 Implications and Future Directions

Sleep complaints are influenced by multiple factors, yet current research lacks systematic organization, features broad study populations, and primarily relies on cross-sectional designs. Future research should employ longitudinal studies to track trajectories of influencing factors and explore physiological mechanisms and interactions between sleep complaints and sleep disorders.

Currently, no specialized assessment tools exist for sleep complaints, with various studies employing different instruments that hinder comparison and analysis. Future research should develop standardized assessment tools for sleep complaints, considering the diverse influencing factors and distinguishing between community and hospital settings to enable healthcare professionals and researchers to select appropriate measurement tools.

Healthcare professionals serve as direct caregivers and primary guides for patients' sleep issues, playing crucial roles in assessment and intervention. While actively treating primary diseases, clinicians should early and accurately identify high-risk populations for sleep complaints, enhance patients' self-management capabilities, and implement interventions including increased physical activity, improved dietary habits, and enhanced social support to improve sleep quality, reduce complaints, and decrease adverse clinical events.

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Note: Figure translations are in progress. See original paper for figures.