



Relationship between Sleep Quality and Vertigo Incidence in College Students

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Abstract

One-third of adults are affected by poor sleep quality. Sleep problems are not only experienced by adults. Knowing the relationship between sleep quality and the incidence of vertigo is very important and urgent because of its very broad impact on health, understanding pathophysiology, clinical development, improving quality of life, as well as education and awareness in the community, especially students. In Indonesia, the prevalence of sleep disorders in adolescents is 62.9%. This study aims to determine the relationship between sleep quality and the incidence of vertigo in students. Literature review using Google Scholar, National Center for Biotechnology Information (NCBI) & Research Science found 9 journals based on inclusion & exclusion criteria. The results of the research is the relationship between sleep quality and vertigo involves a complex interaction between physiological and psychological factors. Physiological effects include disorientation and instability, motor coordination, and physiological stress responses such as cortisol. The psychological effects that can occur are anxiety, depression, decreased concentration, decreased cognitive function, and increased psychological discomfort. Lack of sleep in students makes vertigo symptoms worse. Lack of sleep will make vertigo symptoms worse. It is best to arrange the right sleeping position so that symptoms of vertigo do not occur, because vertigo can occur even in people who have never experienced it. The conclusion is there is a relationship between sleep quality and the incidence of vertigo in students.

Introduction

Rest and sleep is one of the basic human needs included in the physiological needs that must be met by each individual in order to maintain health and achieve self-satisfaction (Ardhyana et al., 2020). One-third of adults are affected by poor sleep quality (Farizy & Graharti, 2021). The cause of poor sleep quality is the presence of sleep disorders (Lontoh & Saputri, 2023). Sleep deprivation is a major health epidemic in society, the prevalence of sleep quality in Australia is 13-33% have poor sleep quality (Kharimah et al., 2022).

In Indonesia, the prevalence of sleep disorders in adolescents was found to be 62.9%, with sleep-wake transition disorder as the most common type of disorder. (Ardiani & Subrata, 2021; Henky & Afrisa, 2023). Students with poor sleep quality can have physical and psychological impacts such as health problems, reduced study concentration, stress, memory impairment and decreased academic performance (Manitu & Sirumpa, 2022).

Sleep disorders can be caused by many things such as sleeping environment, physical condition, stress and anxiety, food and beverage consumption, and physical activity. One of the diseases that can cause sleep disturbance is vertigo. The vestibular system is the brain's most direct way of sensing body movement (Henky & Afrisa, 2023). Vertigo is a sensation of movement or a sense of motion of the body such as rotation (twisting) without the actual sensation of rotation, it can be the surroundings that feel spinning or the body that rotates (Chakravarty, 2020; Katzenberger et al., 2023). In general, the causes of vertigo are vestibular disorders due to head movement or position changes, abnormalities in the ear, hypertension, migraine, vestibular neuritis, Meniere's disease and anxiety disorders (Strupp & Brandt, 2008). Vertigo is a symptom or feeling where a person or objects around them as if they are moving or spinning, which is usually accompanied by nausea or loss of balance (Setiawan et al., 2022). Based on the location of the cause, vertigo can be divided into central and peripheral vertigo (Yanti & Retnaningsih, 2022).

Literature from clinical studies suggests that poor sleep may be a contributing factor to vertigo. People with vestibular disorders such as benign paroxysmal positional vertigo or meniere's disease have poorer self-reported sleep quality and poorer sleep quality is associated with severe dizziness symptoms (Hasibuan et al., 2022).

Literature review research on the relationship between sleep quality and vertigo incidence is very important and urgent because of its far-reaching impact on health, pathophysiology understanding, clinical development, quality of life improvement, as well as education and awareness in the community, especially students. Through this study, we can achieve significant results in improving the welfare of individuals who experience sleep problems and vertigo. This study aims to determine the relationship between sleep quality and concentration level of university students.

Methods

This research was conducted using the literature review method which aims to identify & summarize previously published articles, avoid duplication of research, and search for new areas of study that have not been researched using national and international journals obtained from Google Scholar and the National Center for Biotechnology Information (NCBI). The literature review-based qualitative research method involves collecting and analyzing data from various literature sources relevant to the research topic. Researchers systematically review, evaluate and interpret findings from previous studies to identify patterns, themes or gaps in existing knowledge. This process includes selecting literature based on predetermined criteria, synthesizing the information, and presenting the results in an in-depth narrative form. This method allows the researcher to develop a comprehensive understanding of the issue under study, taking into account its context and complexity. The keywords used for the literature search process were "sleep quality", "vertigo", and "university students".

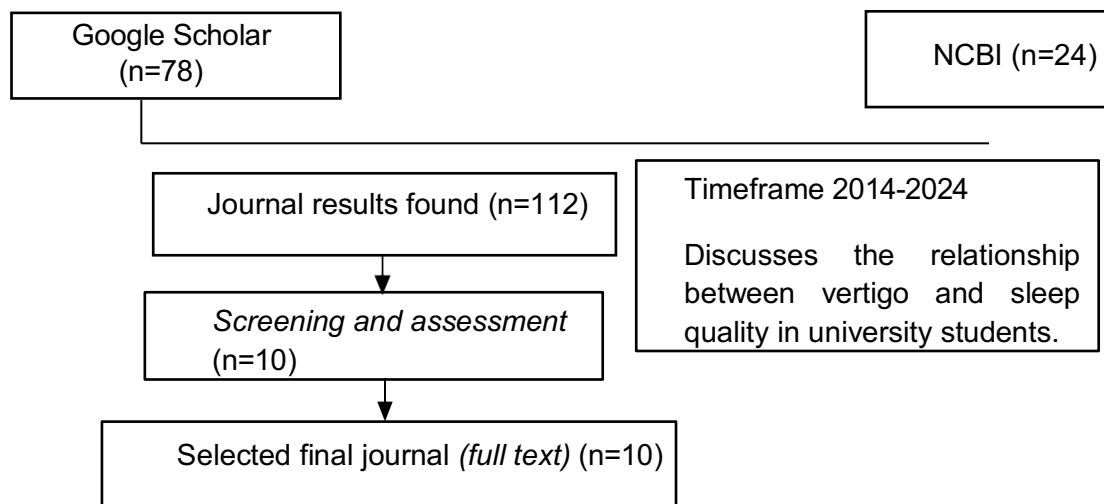


Figure 1. Flow of Literature Review

Result and Discussion

In the results of the literature review, 9 journals were found that agreed with the relationship between sleep quality and the incidence of vertigo in college students. In the results of the SPSS test, most of the samples had poor sleep quality or short sleep duration that exacerbated vertigo disease. Vice versa, having vertigo disease can make poor sleep quality. This is evidenced by the explanation of one of the journals about The Pittsburgh Sleep Quality Index (PSQI), a questionnaire to determine the quality of one's sleep in a period of 1 month subjectively.

However, there was 1 journal that disagreed with the relationship between sleep quality and the incidence of vertigo in university students. This can happen if conducting research with the same theme but different in research methodology, control variables, context and population, and data interpretation.

Inclusion and exclusion criteria were used to eliminate unrelated journals so that 10 journals were obtained from 112 journals. The research flow carried out in writing the thesis starts from determining the topic, searching the literature based on the database of related articles, selecting literature, processing data & conclusions.

Based on the summary results after the search, 9 journals related to sleep quality and the incidence of vertigo in college students were obtained, and 1 journal explaining no relationship is presented in Table 1.

Table 1. Results of literature review study

No.	Title	Author	Methods	Results
1.	Relationship of Anxiety Disorders & Sleep Quality with the Occurrence of Vertigo	(Susanti et al., 2024)	cross sectional	There is an association of anxiety disorders and sleep quality with vertigo as evidenced by 31 samples collected and analyzed using statistical tests with a p level <0.10.
2.	Relationship Between The Pittsburgh Sleep Quality Index (PSQI) & Vertigo Outcome	(Du et al., 2023)	cross sectional	samples with better recovery tended to have better baseline PSQI global scores, PSQI sleep quality, PSQI sleep onset latency, PSQI daytime dysfunction, milder baseline vertigo symptoms indicated by VAS, Vertigo Symptom Scale (VSS) and

				Dizziness Handicap Inventory (DHI) scores.
3.	Relationship between Sleep Quality and Vertigo Syndrome in Gorontalo State University Students	(Mangopa, 2023)	cross sectional	There was no significant relationship between sleep quality and vertigo syndrome (P=0.499, P>0.05).
4.	Chronic Vestibular Hypofunction Is Associated with Impaired Sleep: Results from the DizzyReg Patient Registry	(Katzenberger et al., 2023)	cross sectional	Patients who experienced vertigo for two years or more reported significantly worse global sleep quality (63% vs 37%, p=0.021) and significantly more difficulty falling asleep (79% vs 56%, p=0.013) and sleep efficiency (56% vs 34%, p=0.022).
5.	Relationship between Vertigo and Insomnia in Prima Indonesia University Medical Students 2019	(Hasibuan et al., 2022)	cross sectional.	The results of the chi square statistical test obtained a value of p = 0.0001 (p < 0.05), so it can be stated that there is a significant relationship between vertigo and insomnia in Prima Indonesia University 2019 Medical students.
6.	Relationship between sleep quality and vertigo incidence in medical students at the University of North Sumatra in 2020	(Rahman & Iqbal, 2021)	cross sectional	There is a relationship between sleep quality and the incidence of vertigo with the results of p=0.008 concluded that there is a relationship between sleep quality and the incidence of vertigo.
7.	Differences of Sleep Disorders Between Vestibular Migraine and Benign Paroxysmal Positional Vertigo	(Xue et al., 2021)	cross sectional	The incidence rate of sleep disturbance was significantly higher in patients with vestibular migraine and BPPV.
8.	Overview of Sleep Quality in Peripheral Vertigo Patients	(Iqbal & Amin, 2019)	cross sectional	Of the 60 patients diagnosed with peripheral vertigo, 46 patients (76.7%) had BPPV, 7 patients (11.7%) had vestibular neuritis, 6 patients (10.0%) had Meniere's disease, and 1 patient (1.7%) had labyrinthitis. In patients with peripheral vertigo, 50 people (83.3%) had poor sleep quality.

9.	Vertigo and dizziness in adolescents: risk factors and their population attributable risks	(Filippopoulos et al., 2017)	cross sectional.	Gender, stress, muscle pain in the neck and shoulder region, sleep duration and migraine were identified as independent risk factors after joint adjustment: The relative risks were 1.17 [1.10-1.25] for female gender, 1.07 [1.02-1.13] for stress, 1.24 [1.17-1.32] for muscle pain, and 1.09 [1.03-1.14] for migraine. The population risk attributable to these risk factors was 26%, with muscle soreness, stress, and migraine accounting for 11%, 4%, and 3%, respectively.
10.	Vestibular vertigo is associated with abnormal sleep duration	(Albathi & Agrawal, 2017)	cross sectional	Thirty percent of individuals with vestibular vertigo reported abnormal sleep duration (15.5% short duration and 14.8% long duration). In adjusted analysis, individuals with vestibular vertigo had an RRR of 1.75 (95% CI 1.45-2.11) for having short sleep duration compared to individuals without vestibular vertigo, and an RRR of 1.55 (95% CI 1.26-1.91) for having long sleep duration compared to individuals without vestibular vertigo.

Vertigo is one of the most common and troublesome disorders experienced by most people. In general, vertigo is caused by stress, eye fatigue and certain foods and drinks. In addition, vertigo can be functional and has nothing to do with organ changes in the brain (Pricilia & Nandar Kurniawan, 2021). The brain itself is not sensitive to pain. This means that vertigo is generally not caused by damage within the brain. However, a strain or pressure on the lining of the brain or large blood vessels in the head can cause severe pain in the head. Vertigo is a common complaint in practice described as spinning, dizziness, giddiness, unsteadiness or dizziness. The prevalence of vertigo in Germany, aged 18 years to 79 years is 30%, 24% of which is assumed to be due to vestibular abnormalities. A French study found that 12 months later the prevalence of vertigo was 48%. Generally, vertigo is found in 15% of the population and only 4% - 7% are seen by a doctor (Herlina, 2018).

The relationship between sleep quality and vertigo is related to vestibular system dysfunction (Kumar et al., 2016). Sleep is an important time for cellular repair and regeneration. Lack of sleep can disrupt this process, especially in the vestibular system in the inner ear which is responsible for balance. Cells in the vestibular system need quality sleep to recover their optimal function. Sleep deprivation can also lead to decreased brain function, including the areas that regulate balance and coordination. Decreased function in these areas can exacerbate symptoms of vertigo (Mangopa, 2023).

Changes in blood circulation are also associated with vertigo. Poor sleep can lead to suboptimal oxygenation of the blood, which affects blood flow to the inner ear and brain, thus worsening vertigo. Poor sleep quality can lead to fluctuations in blood pressure which can affect the pressure in the inner ear and cause or worsen vertigo (Hasibuan et al., 2022).

Poor quality sleep can disrupt the balance of neurotransmitters such as serotonin and dopamine. These neurotransmitters play a role in mood regulation and balance, and the imbalance can trigger or worsen vertigo (Rahman & Iqbal, 2021).

Poor sleep quality has a strong association with vertigo. Lack of sleep can affect the vestibular function in the inner ear, which is responsible for maintaining balance. Dysfunction in this system can lead to symptoms of vertigo. Inadequate sleep can lead to extreme fatigue, which often triggers or exacerbates vertigo symptoms in individuals who are prone to this condition (Antara et al., 2015).

The physiological effects of sleep deprivation can lead to disorientation and instability that exacerbate vertigo symptoms. Decreased sleep quality can affect motor coordination, increasing the risk of falls and injury in people with vertigo. Sleep deprivation increases the levels of stress hormones such as cortisol which can affect the vestibular system and worsen vertigo (Salikunna et al., 2022).

Obstructive sleep apnea, a sleep disorder in which breathing stops and restarts repeatedly during sleep, has been associated with an increased incidence of vertigo (Kim et al., 2018). Hypoxia (lack of oxygen,) during apnea episodes can affect blood flow to the inner ear which plays a role in the occurrence of vertigo. Sleep apnea leads to intermittent sleep in poor sleep quality, which in turn may increase the risk of vertigo. Disturbances in the sleep cycle, such as insomnia or irregular sleep schedules can cause dysregulation in the autonomic nervous system which also affects balance and can lead to symptoms of vertigo (Henky & Afrisa, 2023).

Psychological effects that can occur in someone who is sleep deprived can increase the risk of anxiety and depression which in turn can worsen the perception of vertigo symptoms. Anxiety and depression can worsen sleep quality which exacerbates vertigo which is difficult to relieve (Filippopoulos et al., 2017; Filippopoulos et al., 2017). Sleep deprivation can also impair concentration and cognitive function, exacerbating discomfort and instability in people with vertigo. Feelings of dizziness and instability can increase psychological discomfort, affecting overall quality of life (Fahmi et al., 2019).

High stress and anxiety can disrupt sleep quality which can trigger or worsen vertigo. These psychological conditions often lead to muscle tension, increased blood pressure and circulatory disorders, all of which can contribute to the appearance of vertigo (Manitu & Sirumpa, 2022).

Sleep quality is a person's satisfaction with sleep so that the person does not show feelings of fatigue, irritability and restlessness, lethargy, and apathy. Sleep quality is said to be good if a person does not show signs of sleep deprivation. This sleep deprivation condition often occurs in college students with potential causes such as irregular sleep schedules, large loads of assignments that must be completed until late at night, organizational activities that are quite dense, and others. From these potential causes, it can result in a decrease in physiological and psychological conditions in students. Physiological decline such as a decrease in immunity so that students may be susceptible to disease. While the decline in psychological conditions such as lack of student concentration in learning, emotional instability, carelessness, and others (Ardhyana et al., 2020).

Conclusion

Based on the identification and review of several journals in this literature review, there is a relationship between sleep quality and the incidence of vertigo in college students. The relationship between sleep quality and vertigo involves a complex interaction between physiological and psychological factors. Physiological effects are disorientation and instability, motor coordination, and physiological stress response such as cortisol. Psychological effects that can occur are anxiety, depression, decreased concentration, decreased cognitive function, and increased psychological discomfort. Lack of sleep in college students makes vertigo

symptoms worse. Students should arrange the right sleeping position so that vertigo symptoms do not occur, because vertigo can occur for people who have never experienced it though. Managing sleep quality is an important step in vertigo management and improving overall well-being.

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