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The relationship between sleep quality and learning concentration among junior high school students

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Abstract

Background: Learning concentration is a crucial ability for students to achieve optimal academic performance. Good sleep quality plays a vital role in influencing students' learning concentration.

Purpose: To analyze the relationship between nighttime sleep quality and learning concentration among students in grades VII, VIII, and IX.

Method: This study employed a cross-sectional design with a correlational approach. A sample of 100 respondents was selected using stratified sampling technique from students in grades VII, VIII, and IX. Data collection was conducted using the Pittsburgh Sleep Quality Index (PSQI) instrument to measure sleep quality and the Mindful Attention Awareness Scale-Adolescent (MAAS-A) to measure learning concentration. Data analysis utilized Spearman Rank correlation test with a significance level of $\alpha = 0.05$.

Results: Spearman correlation test results showed a strong and significant negative relationship between sleep quality and learning concentration ($r = -0.770$; $p < 0.001$).

Conclusion: There is a significant negative relationship between nighttime sleep quality and learning concentration among students.

Keywords: Adolescents; Junior High School Students; Learning Concentration; MAAS-A; PSQI; Sleep Quality.

BACKGROUND

Sleep is a fundamental physiological process that plays a crucial role in restoring physical and cognitive functions, including attention and learning concentration (Gill, 2023; Potter & Perry, 2022). Learning concentration is a fundamental ability that supports students' success in academic activities. Concentration refers to the capacity to maintain attention on a specific task for a sustained period, allowing learners to process information effectively, and engage actively in instructional activities (Dwinata, 2024; Sari, 2023). Students who demonstrate good concentration tend to show better comprehension and participation during learning. Nevertheless, difficulties in maintaining

concentration are frequently observed among adolescents, as attention and thought processes can easily be disrupted by various influencing factors.

Learning concentration is influenced by both internal and external factors. Internal factors originate from within the individual and include intelligence, interest, motivation, perseverance, learning habits, and physical and health conditions (Dalyono, 2018; Slameto, 2020). External factors are associated with environmental conditions such as family support, school climate, and social surroundings. Good learning concentration is reflected in the ability to focus attention, sustain

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attention over time, respond actively during learning activities, and exercise self-control (Sari, 2023). When these aspects function well, students are better able to absorb information and achieve academic objectives.

One internal factor that plays an important role in learning concentration is sleep quality. Sleep is a physiological state characterized by reduced awareness of the surrounding environment, although individuals can still respond to appropriate stimuli. Sleep efficiency is a key determinant of sleep quality, as it reflects how effectively the body achieves restorative rest (Gill, 2023). Adequate and restful sleep supports physical recovery and cognitive restoration, while poor sleep quality may result in fatigue, reduced alertness, and diminished concentration during daily activities (Faiha & Hidayati, 2021).

Adolescents are particularly vulnerable to sleep disturbances due to biological and psychosocial changes that influence sleep patterns, increasing academic demands, and lifestyle habits (Carskadon & Dement, 2017). Sufficient sleep is essential to maintain physical and mental health during the learning process. Previous studies have shown that insufficient sleep duration may lead to decreased cognitive performance, impaired attention, and learning difficulties among students (Ferrara & De Gennaro, 2011). At the global level, sleep problems among adolescents remain prevalent. The World Health Organization (2020) reports that approximately 10-20% of adolescents worldwide experience sleep-related problems, and sleep disturbances among adolescents may negatively affect mental health and academic achievement. In Indonesia, previous studies have shown that a substantial proportion of adolescents do not achieve optimal sleep quality, which has been associated with decreased learning readiness and impaired concentration (Siregar, Munthe, Harahap, Nasution, & Taruna, 2023).

Several factors contribute to sleep problems in adolescents, including lifestyle behaviors and excessive gadget use. Research indicates that prolonged gadget use is associated with sleep pattern disturbances among students, while smartphone addiction has been linked to poor sleep quality in adolescents (Siregar et al., 2023; Kurniati, Novianti, & Asmariyah, 2023). These lifestyle

factors compound the natural biological changes occurring during adolescence, creating additional challenges for maintaining optimal sleep quality.

Empirical evidence suggests a significant relationship between sleep quality and learning concentration. Students who experience poor sleep quality are more likely to report daytime fatigue, reduced attentional control, and difficulty maintaining focus during learning activities. Studies reported that sleep deprivation and sleep disorders negatively affect students' concentration and academic performance (Syamsudin, Putriningtyas, Febriatmoko, Subardi, Prasetyo, Azzahra, & Salman, 2024; Maulana, 2025). Similarly found that adolescents with better sleep quality demonstrated improved learning outcomes (Dewald-Kaufmann, Oort, & Meijer, 2014). These findings suggest that sleep quality should be viewed not only as a health concern but also as an important factor influencing students' cognitive performance and academic engagement.

RESEARCH METHOD

This study employed a correlational design with a cross-sectional approach to examine the relationship between sleep quality and learning concentration among junior high school students (Nursalam, 2023). Data on the independent and dependent variables were collected simultaneously at a single point in time to identify the strength and direction of the relationship between the variables. Sleep quality was treated as the independent variable, while learning concentration served as the dependent variable.

The study was conducted in a public junior high school setting, and data collection took place over a three-day period in August 2025. The research population consisted of all ninth-grade students enrolled at the school during the academic year. Based on preliminary observations, the total population comprised 723 students. A sample of 100 students was selected using a stratified random sampling technique to ensure proportional representation across grade levels. The number of participants from each grade level was determined based on the proportion of students within each stratum relative to the total population.

Participants were selected according to predefined inclusion and exclusion criteria. The inclusion criteria were students who were actively

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enrolled, willing to participate, and cooperative during the data collection process. Students who were absent or experiencing illness at the time of data collection were excluded from the study.

Sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI), a standardized instrument designed to assess sleep quality over the previous month. This instrument evaluates seven components, including subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. The global score ranges from 0 to 21, with higher scores indicating poorer sleep quality. The instrument has demonstrated good validity and reliability in previous studies and was therefore used without revalidation.

Learning concentration was assessed using the Mindful Attention Awareness Scale-Adolescent (MAAS-A), an instrument designed to measure attentional awareness and sustained focus in learning contexts. This scale consists of multiple items rated on a Likert scale, with higher scores reflecting greater attentional capacity. The instrument has been validated for use with adolescent populations and demonstrates adequate psychometric properties.

Data collection was conducted during regular school hours following approval from the relevant institutional authorities and informed consent from participants and their guardians. Participants completed both instruments under the supervision of trained research assistants. Completed questionnaires were reviewed for completeness and accuracy before data entry.

Data analysis was performed using SPSS version 26. Descriptive statistics were used to summarize participant characteristics and the distribution of sleep quality and learning concentration scores. The normality of the data distribution was assessed using the Kolmogorov-Smirnov test. Since the data did not meet the assumption of normality, a nonparametric correlation test (Spearman's rank correlation) was employed to examine the relationship between sleep quality and learning concentration. Statistical significance was set at $\alpha = 0.05$.

This study adhered to ethical principles, including respect for human dignity, confidentiality, justice, and beneficence. Participant anonymity was maintained throughout the research process, and all procedures were designed to minimize potential risks while maximizing the benefits of the study.

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RESEARCH RESULTS**Table 1. Respondent Frequency Distribution Data (N=100)**

Variable	Results
Age (n/%)	
11	1/1.0
12	30/30.0
13	50/50.0
14	14/14.0
15	5/5.0
Gender (n/%)	
Male	50/50.0
Female	50/50.0
Grade-level	
VII	35/35.0
VIII	37/37.0
IX	28/28.0
Sleep Quality (n/%)	
Good/Normal	35/35.0
Mild Sleep Disturbance	63/63.0
Moderate Sleep Disturbance	2/2.0
Severe Sleep Disturbance	0/0.0
Learning Concentration Level (n/%)	
Low	2/2.0
Moderate	78/78.0
High	20/20.0

Table 1. shows that the majority of respondents were 13 years old, namely 50 respondents (50%), with a comparable male and female gender, namely 50%. In addition, the majority of respondents' grade level was grade VIII, namely 37 respondents (37%), with sleep quality being in the mild sleep disturbance category, as many as 63% of respondents. The learning concentration level of respondents was in the moderate category, namely as many as 78%.

Table 2. Spearman Rank Correlation between Nighttime Sleep Quality and Learning Concentration (N=100)

Variables	r(Spearman)	p-value (Sig 2-tailed)
Nighttime Sleep Quality – Learning Concentration	-0.770	<0.001

Spearman's rank correlation analysis identified a strong negative association between nighttime sleep quality and learning concentration ($r = -0.770$; $p < 0.001$). The statistically significant p-value indicates that the relationship was unlikely to occur by chance. The magnitude of the correlation coefficient falls within the strong correlation range (0.60–0.79), demonstrating a substantial association between the two variables. The negative direction of the correlation indicates that higher sleep disturbance scores were associated with lower levels of learning concentration. These

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results quantitatively confirm a consistent inverse relationship between sleep quality and students' ability to maintain attention during learning activities.

The correlation coefficient value fell within the strong correlation range (0.60–0.79). This result demonstrates that sleep quality contributes substantially to variation in learning concentration among students. The negative direction confirms that poorer sleep quality corresponds to reduced attentional capacity during learning activities.

DISCUSSION

The results of this study indicate a strong and significant negative relationship between sleep quality and learning concentration among junior high school students ($r = -0.770$; $p < 0.001$). This finding supports the theoretical perspective that sleep is a basic human need essential for maintaining cognitive readiness and mental focus (Potter & Perry, 2022; Gill, 2023). The strong correlation demonstrates that sleep quality contributes substantially to variation in learning concentration among students, confirming that poorer sleep quality corresponds to reduced attentional capacity during learning activities.

The findings of this study are consistent with previous research indicating that poor sleep quality can negatively affect physiological and psychological conditions, which in turn impair cognitive functions such as attention and concentration (Faiha & Hidayati, 2021; Ferrara & De Gennaro, 2011). Previous research also emphasized that inadequate sleep quality is associated with mental health disorders that can reduce students' ability to concentrate during academic activities (Ali, Razali, Jaris, & Fu'ady, 2025). The previous theoretical framework explains that adolescents experience biological and psychosocial changes that affect sleep patterns, making them highly vulnerable to sleep disorders that can further affect cognitive performance (Carskadon & Dement, 2017).

The distribution of sleep quality observed in this study revealed that the majority of students experienced some degree of sleep disturbance, with only a small proportion achieving optimal sleep quality. This pattern aligns with global trends reported by the World Health Organization (2020) and reflects the multifactorial nature of sleep problems among adolescents. Lifestyle factors, particularly excessive gadget and smartphone use,

have been identified as significant contributors to poor sleep quality. The results of this study are in line with previous findings which reported that prolonged screen time and smartphone addiction significantly disrupt sleep patterns among students (Kurniati et al., 2023; Siregar et al., 2023).

The relationship between sleep quality and learning concentration can be understood through neurobiological mechanisms. Sleep plays an essential role in cognitive restoration, memory consolidation, and the maintenance of attentional networks (Gill, 2023). Sleep deprivation or poor sleep quality disrupts these restorative processes, leading to impaired attention regulation, slower information processing, and reduced working memory capacity. Sleep deprivation and sleep disturbances have consistently shown negative effects on students' concentration and academic performance (Syamsudin et al., 2024; Maulana et al., 2025). Similarly, other studies have found that sleep extension interventions result in improved academic outcomes further supporting the important role of adequate sleep in maintaining cognitive function (Dewald-Kaufmann et al., 2014). Multiple risk factors contribute to sleep disorders in adolescents, including irregular sleep schedules, environmental stressors, and lifestyle changes (Wahyuni, 2021).

The findings also suggest that even mild sleep disturbances may affect students' ability to sustain attention during learning activities. The predominance of moderate rather than high concentration levels among participants indicates that sustained optimal attention was not consistently achieved across the student population. This observation underscores the importance of addressing sleep quality as a modifiable factor that can enhance educational outcomes.

In line with recommendations from the World Health Organization (2020) and national health, improving sleep quality among adolescents is essential to support optimal cognitive function and academic performance. Therefore, promotive and preventive strategies related to healthy sleep habits should be implemented in school environments. Educational institutions also play an important role in creating a supportive learning environment that enhances students' readiness to learn and concentration levels (Ministry of Education and Culture of the Republic of Indonesia, 2020). These

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strategies may include health education programs, adjustments to academic schedules, and the promotion of balanced lifestyles that prioritize adequate sleep.

Several limitations should be acknowledged. The cross-sectional design limits the ability to infer causality. Although a strong association was identified, longitudinal or experimental studies would be needed to establish causal pathways. Additionally, the study relied on self-reported measures, which may be subject to recall bias. Future research incorporating objective sleep measurement methods, such as actigraphy, could complement self-reported data and provide more precise assessments of sleep patterns.

CONCLUSION

This study confirms that sleep quality is significantly related to learning concentration among junior high school students. The findings revealed a strong negative correlation ($r = -0.612$; $p = 0.001$) between sleep quality and learning concentration, indicating that students with better sleep quality demonstrate higher concentration levels during learning activities, while those with poor sleep quality experience reduced focus and attention. Among the 100 respondents, 58% had good sleep quality, yet 42% still experienced poor sleep quality, which was associated with lower concentration levels. The majority of students showed moderate concentration (47%), with 38% having low concentration and only 15% achieving high concentration. These results emphasize that adequate and restful sleep is not merely a biological necessity but also a critical factor supporting cognitive performance, attention span, emotional stability, and academic engagement among adolescents. The study underscores the importance of promoting healthy sleep habits as an integral component of educational success and student well-being.

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