

The Influence of Sleep on Study Skills among Adolescent Students in Kohima, Nagaland: A Cross-Sectional Study

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Abstract

Background/Objective: Sleep is essential for cognitive functioning, memory consolidation, and learning efficiency during adolescence. However, insufficient sleep and elevated daytime sleepiness are increasingly impairing study behaviors among youth. This study examined the relationship between daytime sleepiness and study skills among higher secondary school students in Kohima, Nagaland.

Methods: A quantitative, cross-sectional design was employed with a sample of 360 adolescent students (N=180 males, N=180 females) selected via convenience sampling. Daytime sleepiness was measured using the Cleveland Adolescent Sleepiness Questionnaire (CASQ), and study skills were assessed using the Study Skills Assessment Tool (SSAT). Data were analyzed using descriptive statistics, independent samples t-tests, Pearson correlation, and hierarchical linear regression in SPSS (Version 27).

Results: Independent samples t-tests revealed no significant gender differences in sleepiness ($t(358)=-0.063, p=.950$) or study skills ($t(358)=0.045, p=.964$). Pearson correlation indicated a strong, negative relationship between daytime sleepiness and study skills ($r=-.704, p<.001$). Hierarchical linear regression demonstrated that after controlling for gender, daytime sleepiness significantly predicted study skills ($\beta=-.708, t=-18.984, p<.001$), accounting for 50.1% of the incremental variance ($\Delta R^2=.501, F(1,357)=360.38, p<.001$; total model $R^2=.503$).

Conclusion: Daytime sleepiness exerts a substantial negative influence on academic study skills among adolescents in Kohima. Targeted sleep hygiene education and institutional wellness interventions are urgently needed to mitigate sleep disturbances and enhance academic functioning in this population.

Keywords: Sleepiness; Study skills; Adolescents; Academic performance; Kohima; Nagaland

Introduction

Sleep represents a fundamental biological rhythm characterized by natural, cyclic restoration processes essential for maintaining optimal physiological and cognitive health during adolescence (Ciccarelli & Meyer, 2013; Paruthi et al., 2016). Although individuals may transiently tolerate acute sleep restriction, sustained sleep deprivation severely impairs neurobehavioral functioning (Ciccarelli & Meyer, 2013). Even a single night of inadequate sleep destabilizes attention networks, producing marked decrements in concentration, processing speed, and execution of basic cognitive tasks (Ciccarelli & Meyer, 2013). Paediatric guidelines recommend 8 to 10 hours of regular nocturnal sleep for adolescents to support normative brain development, neuroendocrine regulation, and somatic growth (Paruthi et al., 2016). Clinicians have increasingly emphasized that childhood and adolescent sleep plays a vital role in neural plasticity, immune enhancement, and emotional self-regulation; yet, an estimated 20% to 60% of youth suffer from chronic sleep deprivation—a trend expanding across urban India (Nagaland Post, 2026). Shortened sleep duration and elevated daytime sleepiness directly degrade memory consolidation, thereby compromising adolescents' capacity for classroom learning and cognitive performance (Sharman & Illingworth, 2020).

Study skills refer to the structured cognitive and behavioral strategies learners employ to acquire, organize, synthesize, and retrieve knowledge (Vijayabanu & Sri, 2017). These self-regulatory behaviors serve as vital predictors of academic performance and overall learning efficiency (Naqvi et al., 2018). Crucially, restorative sleep facilitates the offline consolidation of declarative and procedural memory, which provides the neurobiological foundation for effective study behaviors. Conversely, sleep disturbances disrupt prefrontal cortex function, impairing executive capacities such as working memory, attentional control, and cognitive flexibility (Thomas et al., 2014). Recent empirical evidence demonstrates that irregular and insufficient sleep schedules among adolescents correlate

strongly with compromised cognitive functioning and academic decline (Saha et al., 2026; Zhu et al., 2024). Sufficient, high-quality sleep is therefore an indispensable prerequisite for maintaining cognitive integrity, optimizing study skill application, and promoting long-term academic achievement (Alam et al., 2024, as cited in Zhasa et al., 2025).

Theoretical Framework

The theoretical framework of this study integrates Information Processing Theory and Self-Regulated Learning (SRL) Theory to explain the relationship between adolescent sleep patterns and study skills. Information Processing Theory conceptualizes cognition through sequential stages of encoding, storage, and retrieval, wherein structural neurodevelopment during adolescence enhances processing efficiency, working memory, and executive control—capacities that directly underpin core study skills like note-taking, reading comprehension, and information retention. Sleep restriction disrupts these mechanisms by impairing prefrontal cortex function, destabilizing attentional networks, and hindering memory consolidation, thereby degrading an adolescent's ability to encode and retrieve academic information. Complementarily, Self-Regulated Learning Theory posits that academic success requires proactive control over cognitive, metacognitive, and behavioral strategies, such as goal setting, time management, and persistent effort. Adequate nocturnal sleep provides the physiological baseline required for executive function and self-regulation, whereas sleep deprivation induces cognitive fatigue and attentional lapses that undermine the volitional control needed to organize study schedules and execute effective study behaviors. Together, these perspectives demonstrate that chronic daytime sleepiness impairs both the cognitive processing capacity and the self-regulatory control essential for maintaining effective study skills (Information Processing Theory, 2023 & Zimmerman, 2015).

Review of Literature:

Sleep, Cognitive Functioning, and Academic Performance

Extensive literature underscores the vital role of adequate sleep in supporting neurocognitive development and academic performance during adolescence. Sleep loss and degraded sleep quality consistently correlate with impaired cognitive processing, reduced learning capacity, and diminished overall academic achievement (Curcio et al., 2006). Sleep disturbances directly undermine executive function; specifically, subjective sleep difficulties predict impaired attentional control and heightened difficulty maintaining concentration during classroom instruction and self-directed academic tasks (Tynjala et al., 1999). At the neurocognitive level, adolescent sleep problems are strongly associated with working memory deficits—a core cognitive constraint that compromises complex comprehension, active information retention, and memorization strategies (Thomas et al., 2014). Furthermore, longitudinal observations indicate that sleep disturbances during early adolescence tend to persist, elevating the risk for chronic neurobehavioral and academic difficulties later in development (Thomas et al., 2014).

Recent empirical investigations reinforce the critical importance of optimal sleep hygiene for academic success. Restorative sleep quality positively predicts efficient cognitive styles, sustained attentional regulation, and overall scholastic achievement (Afonja & Ogundele, 2026; Wang & Lu, 2025). However, the vast majority of existing studies evaluate sleep outcomes in relation to general cognitive indices or cumulative Grade Point Averages (GPA), rather than examining specific behavioral study strategies. Specific study skills—such as structured reading, systematic note-taking, active memorization, conceptual comprehension, and effective time management—serve as critical operational predictors of academic achievement (Singh, 2024). Study skills may therefore represent the primary behavioral bridge connecting underlying neurocognitive capacity to academic performance.

Contextual Research Gaps

Despite the growing body of literature, empirical findings regarding the exact relationship between sleep parameters

and academic outcomes remain inconsistent across diverse populations. While several researchers document significant positive associations between optimal sleep quality and academic performance (Sah et al., 2024; Wang & Lu, 2025), other investigations report non-significant relationships between sleep quality and learning achievement among student cohorts (Putra et al., 2023). Consequently, it remains unclear whether sleep hygiene exerts a direct effect on specific study skill execution, or whether its influence is entirely mediated through secondary cognitive constructs such as working memory and attentional control. To address these inconsistencies, intervention studies advocate for sleep hygiene education to rectify distorted sleep architecture (Kira et al., 2014), alongside institutional awareness initiatives to mitigate circadian disruptions among youth (Sah et al., 2024).

Furthermore, geographic and cultural generalizability remains a major limitation in the current body of literature. Previous empirical studies have predominantly focused on international samples across Bangladesh, China, Indonesia (Denpasar), Oman, Greece, New Zealand, and Nigeria, or have concentrated selectively on high-stress cohorts such as medical undergraduates. There is a pronounced scarcity of empirical research examining these dynamics among indigenous adolescent populations in Northeast India, particularly in Kohima, Nagaland. Moreover, existing regional studies continue to examine sleep quality and academic achievement in isolation, omitting the concrete study skills students employ daily.

The Present Study

To address these empirical, theoretical, and contextual gaps, the present study investigates the direct influence of sleep (daytime sleepiness) on study skills among adolescent students in Kohima, Nagaland. Specifically, this study addresses the primary research question: Does daytime sleepiness significantly influence academic study skills among adolescent students in Kohima, Nagaland?

Research Methodology

Research Design

A quantitative, cross-sectional research design was adopted to empirically assess the influence of daytime sleepiness on academic study skills among adolescent students in Kohima, Nagaland.

Participants and Sampling

The study comprised a sample of N=360 higher secondary school students selected using a non-probability convenience sampling technique. The sample was equally distributed by gender, consisting of 180 male students (50%) and 180 female students (50%).

- **Inclusion Criteria:** Enrolled higher secondary school students (grades 11–12) residing in Kohima, Nagaland, who provided informed assent and parental consent.
- **Exclusion Criteria:** Students with a prior medical diagnosis of psychological disorders, chronic neurodevelopmental conditions, or ongoing clinical sleep treatments.

Psychometric Measures

Data were collected using two standardized, self-report psychometric instruments:

1. Cleveland Adolescent Sleepiness Questionnaire (CASQ): Developed by Spilsbury et al. (2007), the CASQ is a 16-item self-report scale designed to measure excessive daytime sleepiness and nighttime alertness in adolescents aged 11–17 years. Responses are rated on a 5-point Likert scale ranging from 1 (Never) to 5 (Almost Every Day). Sleepiness items (items 1, 3, 4, 6, 9, 10, 12, 14, 15, 16) are scored directly (1–5), while alertness items (items 2, 5, 7, 11, 13) are reverse-scored (5–1). Total scores range from 16 to 80, with scores of 43 or higher indicating clinically significant daytime sleepiness and heightened sleep disturbances. In the current study, the CASQ demonstrated high internal consistency ($\alpha=0.89$).

2. Study Skills Assessment Tool (SSAT): Developed and standardized by Vijayabanu and Sri (2017), the SSAT measures self-regulatory study behaviors across 35 items. The instrument evaluates seven core dimensions: Reading, Note-

Taking, Studying, Memorization, Exam Preparation, Time Management, and Comprehension. Items are scored on a 5-point Likert scale (1 = Never, 2 = Rarely, 3 = Occasionally, 4 = Frequently, 5 = Always), yielding total scores from 35 to 175, where higher scores reflect superior study skill proficiency. Normative cut-offs for sub-dimensions classify performance as Poor (5–12), Average (13–20), or Good (21–25). The scale exhibited robust reliability in the present sample ($\alpha=0.80$, with subscale reliabilities ranging from 0.77 to 0.82).

Measure	Items	Rating Scale	Cronbach's Alpha (α)
Cleveland Adolescent Sleepiness Questionnaire (CASQ)	16	5-point Likert (1–5)	0.89
Study Skills Assessment Tool (SSAT)	35	5-point Likert (1–5)	0.80

Procedure

Institutional ethical clearance and formal administrative approvals were secured prior to data collection. Participants and their parents/legal guardians were informed about the nature and objectives of the study, and written informed consent/assent was obtained. Questionnaires were administered in group sessions during school hours with standardized instructions provided regarding completion procedures.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics (Version 27). Descriptive statistics (means, standard deviations, skewness, and kurtosis) summarized the demographic and psychological variables. Independent samples t-tests evaluated potential gender differences. Pearson product-moment correlation coefficients assessed linear associations between daytime sleepiness and study skills. Finally, hierarchical linear regression analysis was performed to test the incremental predictive capacity of daytime sleepiness on study skills after controlling for participant gender.

Ethical Considerations

Participation was entirely voluntary, with students informed of their right to withdraw at any point without academic penalty. Complete anonymity and data confidentiality were maintained by assigning numerical identifiers to participant protocols in accordance with institutional guidelines and international ethical standards for research involving human subjects.

Results

Preliminary Analysis, Descriptive Statistics, and Normality

Prior to conducting inferential analyses, data were screened for completeness, missing values, and univariate normality. Descriptive statistics for daytime sleepiness, measured via the Cleveland Adolescent Sleepiness Questionnaire (CASQ), and study skills, measured via the Study Skills Assessment Tool (SSAT), were evaluated across the total sample ($N=360$) as well as by gender subgroup ($n=180$ males, $n=180$ females).

As shown in Table 1, skewness values ranged from -0.191 to 0.337 and kurtosis values ranged from -1.129 to -0.162. Because all skewness and kurtosis values fell comfortably within the recommended cut-off threshold of $[-1.0, +1.0]$,

the assumptions for parametric statistical testing were satisfied.

To test for baseline demographic differences between male and female adolescent students, independent-samples t-tests were conducted. Results indicated no statistically significant gender difference in daytime sleepiness scores, $t(358)=-1.251$, $p=.212$, $d=-0.132$. Similarly, overall study skills scores did not differ significantly between male and female students, $t(358)=-0.776$, $p=.438$, $d=-0.082$.

Table 1: Descriptive Statistics, Normality Metrics, and Gender Comparisons (N=360)

Variable / Subgroup	n	Mean	SD	Min	Max	Skewness	Kurtosis	t-value	df	p-value	Cohen's d
Daytime Sleepiness (CASQ)											
Total Sample	360	38.34	12.14	16	68	-0.15	-0.91	—	—	—	—
Male	180	37.54	12.59	16	64	-0.09	-1.13	-1.25	358	.21	-0.13
Female	180	39.14	11.66	16	68	-0.19	-0.62				
Study Skills (SSAT)											
Total Sample	360	105.46	25.11	45	167	0.11	-0.33	—	—	—	—
Male	180	104.43	28.01	45	167	0.05	-0.59	-0.78	358	.43	-0.08
Female	180	106.48	21.85	49	162	0.34	-0.16				

Bivariate Correlation Analysis

To examine the direct linear relationship between daytime sleepiness and study skills among adolescent students, Pearson correlation coefficients were calculated. As presented in Table 2, a strong, inverse (negative) correlation was observed between CASQ scores and SSAT scores in the overall sample, $r(358)=-.704$, $p<.001$. This indicates that higher levels of daytime sleepiness are associated with significantly lower study skills performance.

Subgroup correlation analyses demonstrated similar negative patterns for both male students, $r(178)=-.709$, $p<.001$, and female students, $r(178)=-.714$, $p<.001$. A Fisher z-transformation test confirmed that the strength of the correlation did not significantly differ between male and female adolescents, $z=0.098$, $p=.922$.

Table 2: Pearson Correlation Matrix Between Daytime Sleepiness and Study Skills

Variable	1	2
1. Daytime Sleepiness (CASQ)	—	-.704**
2. Study Skills (SSAT)	-.704**	—

Note. N=360.

$p<.001$ (2-tailed).

Hierarchical Multiple Regression Analysis

To test whether daytime sleepiness significantly predicted study skills beyond demographic variance, a two-stage hierarchical linear regression analysis was executed. Participant gender was entered as a binary control variable in Step 1, followed by daytime sleepiness (CASQ total score) in Step 2.

In Step 1, participant gender did not account for a significant proportion of variance in study skills, $R^2=.002$, $F(1,358)=0.603$, $p=.438$.

In Step 2, the addition of daytime sleepiness led to a statistically significant increase in explained variance, $\Delta R^2=.501$, $\Delta F(1,357)=360.38$, $p<.001$. The full model was highly significant, $F(2,357)=180.81$, $p<.001$, accounting for 50.3% of the total variance ($R^2=.503$, Adjusted $R^2=.500$) in adolescent study skills.

In the final step, daytime sleepiness emerged as the dominant negative predictor ($\beta=-.708$, $B=-1.468$, $SE=0.077$, $t=-18.984$, $p<.001$, 95% CI [-1.620, -1.316]). Each one-point increase in daytime sleepiness was associated with a 1.468-point reduction in study skills score, confirming that daytime sleepiness significantly impairs study skills performance independent of student gender.

Table 3: Hierarchical Multiple Regression Analysis Predicting Study Skills (N=360)

Predictor Variable	Unstandardized B	Standard Error (SE)	Standardized β	t-value	p-value	95% CI for B
Step 1						
Constant	104.428	1.864	—	56.012	< .001	[100.761, 108.094]
Gender	2.056	2.636	.041	0.776	.438	[-3.129, 7.240]
Step 2						
Constant	159.540	3.190	—	50.008	< .001	[153.266, 165.814]
Gender	4.404	1.875	.088	2.349	.019	[0.717, 8.091]
Daytime Sleepiness (CASQ Score)	-1.468	0.077	-.708	-18.984	< .001	[-1.620, -1.316]

Discussion

The primary objective of the present study was to investigate the empirical relationship between daytime sleepiness and study skills among adolescent students (N=360) in Kohima, Nagaland. In direct alignment with the proposed hypothesis, the statistical results demonstrated a strong, statistically significant inverse correlation between daytime sleepiness, as measured by the Cleveland Adolescent Sleepiness Questionnaire (CASQ), and overall study skills, measured via the Study Skills Assessment Tool (SSAT), $r(358)=-.704$, $p<.001$. Subgroup correlation analyses confirmed that this strong negative relationship holds equally true across both male ($r=-.709$, $p<.001$) and female ($r=-.714$, $p<.001$) students, with no significant gender difference in correlation magnitude ($z=0.098$, $p=.922$).

Furthermore, the hierarchical multiple regression analysis established daytime sleepiness as the dominant negative predictor of study skills, accounting for 50.1% of unique variance beyond demographic differences ($\Delta R^2=.501$, $\Delta F(1,357)=360.38$, $p<.001$). The full regression model explained 50.3% of the overall variance ($R^2=.503$, Adjusted $R^2=.500$, $F(2,357)=180.81$, $p<.001$), with daytime sleepiness exerting a powerful negative effect ($\beta=-.708$, $B=-1.468$, $t=-18.984$, $p<.001$). Uniquely, the unstandardized slope coefficient ($B=-1.468$) demonstrates that for every single-

point increase in a student's daytime sleepiness score, their study skills performance decreases by 1.468 points. Although the majority of prior empirical studies have focused on broad academic metrics—such as grade point average (GPA), examination scores, or overall cognitive performance—rather than domain-specific study skills, their conclusions provide strong indirect support for the current findings. As Vijayabanu and Sri (2017) highlighted, study skills comprise the procedural and behavioral strategies deployed during learning (e.g., active reading, note-taking, time management, memorization, and comprehension), whereas academic performance represents the downstream outcome of these strategies. Because study skills serve as the operational bridge between baseline intellectual capacity and academic achievement, impairments in sleep architecture directly disrupt the daily behavioral execution required for academic success.

The mechanistic link between elevated sleepiness and degraded study skills is well-supported by Information Processing Theory, which posits that effective learning depends on sequential stages of attention, encoding, storage, and retrieval. Essential study skills—such as synthesizing complex text, taking organized lecture notes, and preparing for evaluations—place heavy demands on executive functioning. Excessive daytime sleepiness compromises these cognitive mechanics; inadequate sleep in adolescents impairs attentional control and executive processing (De Bruin et al., 2017). Sleep difficulties among adolescents are strongly linked with reduced concentration on schoolwork and deficits in working memory (Thomas et al., 2014; Tynjälä et al., 1999). These neurocognitive bottlenecks manifest directly as degraded study habits and impaired self-regulated learning routines, corroborating findings by Afonja and Ogundele (2026), Curcio et al. (2006), Singh (2024), and Wang and Lu (2025), who confirmed that inadequate sleep restricts overall learning capacity, academic functioning, and daily study behavior.

Conversely, Putra et al. (2023) observed no significant relationship between sleep quality and learning achievement among students. This divergence can be understood through two key conceptual and contextual distinctions:

1. Construct Divergence: Learning achievement (e.g., examination marks or overall GPA) and study skills (e.g., structured study methods and time allocation) are distinct psychological constructs. External factors, such as lenient assessment criteria, cramming, or baseline cognitive resilience, may temporarily cushion final grades even when underlying study habits are severely compromised.

2. Socio-Environmental Buffer: Environmental factors, particularly the home atmosphere, act as critical moderating variables. As Tynjälä et al. (1999) noted, a supportive home atmosphere is a vital component of healthy sleep hygiene. In supportive home environments, structural routines may buffer academic outcomes despite sleep deficits. The baseline demographic analyses in the current study further demonstrate that male ($M=37.54$, $SD=12.59$) and female ($M=39.14$, $SD=11.66$) adolescents exhibited statistically comparable baseline levels of daytime sleepiness, $t(358)=-1.251$, $p=.212$, $d=-0.132$, as well as equivalent overall study skills ($M=104.43$ vs. $M=106.48$), $t(358)=-0.776$, $p=.438$, $d=-0.082$. However, when sleepiness was introduced into the final regression model, gender emerged as a minor covariate ($B=4.404$, $\beta=.088$, $p=.019$), indicating that when controlling for daytime sleepiness, female students exhibited slightly higher baseline study skills scores.

Practical Implications and Regional Application

These findings hold immediate practical significance for educators, school counselors, and institutional administrators in Kohima and across Nagaland. Given that daytime sleepiness directly drives over half of the total variance ($\Delta R^2=.501$) in adolescent study skills, academic intervention programs cannot focus solely on traditional study-skill workshops (such as note-taking or time-management instruction). Educational institutions must integrate comprehensive sleep hygiene education into high school curricula. Interventions aimed at curtailing late-night screen time, mitigating nocturnal bedtime procrastination, aligning school schedules with adolescent circadian shifts, and fostering supportive home environments represent vital prerequisite steps toward restoring cognitive capacity and optimizing student study behaviors.

Methodological Limitations and Future Directions

Several methodological constraints should be noted when interpreting these findings:

- **☒Cross-Sectional Architecture:** The cross-sectional design precludes definitive directional or causal inferences regarding whether sleepiness directly degrades study skills or whether poor study habits (e.g., inefficient late-night studying) induce daytime fatigue.
- **☒Self-Report Measurement:** Relying on self-report instruments (CASQ and SSAT) introduces potential subjective reporting bias or recall inaccuracies.
- Future research should utilize longitudinal designs and objective measurement tools (such as actigraphy or polysomnography) alongside direct behavioral observation of study routines. Furthermore, investigating potential mediating mechanisms—such as pre-sleep cognitive arousal, trait fear of missing out (FOMO), academic anxiety, and home environmental quality—will provide a more complete understanding of adolescent academic thriving across diverse regional settings.

Conclusion

The present study provides robust empirical evidence on the critical role of sleep in shaping study skills among adolescent students (N=360) in Kohima, Nagaland. The findings demonstrate a strong, statistically significant inverse relationship between daytime sleepiness and study skills ($r=-.704$, $p<.001$). Furthermore, hierarchical regression analysis revealed that daytime sleepiness is the primary negative predictor of study skills, accounting for 50.1% of unique variance ($\Delta R^2=.501$, $\beta=-.708$, $p<.001$) independently of student gender. Every unit increase in daytime sleepiness corresponds to a 1.468-point decrement in overall study skills performance, underscoring that sleep debt severely disrupts adolescents' capacity to execute effective learning strategies.

Theoretically, these results reinforce Information Processing Theory by highlighting how sleep deficits compromise foundational cognitive mechanics—specifically attention, encoding, working memory consolidation, and retrieval. When daytime sleepiness is elevated, neurocognitive fatigue impairs executive functioning, rendering it difficult for adolescents to apply strategic study behaviors such as active reading, organized note-taking, time management, memorization, and comprehension. Consequently, poor sleep hygiene acts as a key cognitive bottleneck that degrades daily self-regulated learning habits before impacting broader academic performance.

Given that daytime sleepiness drives over half of the variance in adolescent study skills, academic performance cannot be improved through conventional study-skill workshops alone. Educational institutions, school counselors, and public health stakeholders in Nagaland must prioritize institutional sleep hygiene initiatives. Key policy and practical recommendations include:

- **☒Institutional Sleep Education:** Integrating evidence-based sleep hygiene modules into school curricula to educate students on circadian rhythms, digital hygiene, and the risks of bedtime procrastination.
- **☒Parental & Community Awareness:** Conducting community workshops to emphasize the role of a structured home atmosphere and consistent sleep routines in fostering adolescent cognitive resilience.
- **☒Targeted School Interventions:** Establishing school-based counseling screening programs to identify students suffering from severe daytime sleepiness and providing tailored academic support.

Ultimately, promoting restorative sleep is not merely a health concern, but an essential educational prerequisite for optimizing study skills and fostering long-term academic success among adolescents in Kohima, Nagaland.

Declaration of competing interest:

The authors declare that they have no conflicts of interest to this work.

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REFERENCES:

1. Afonja, O., & Ogundele, O. (2026). Sleep quality, cognitive performance, and academic achievement among adolescents. *Journal of Adolescent Health and Education*, 12(1), 45–58.
2. Ciccarelli, S. K., & Meyer, G. E. (2013). *Psychology* (3rd ed.). Pearson Education.
3. Curcio, G., Ferrara, M., & De Gennaro, L. (2006). Sleep loss, learning capacity and academic performance. *Sleep Medicine Reviews*, 10(5), 323–337. <https://doi.org/10.1016/j.smr.2005.11.001>
4. De Bruin, E. J., van Run, C., Staaks, J., & Meijer, A. M. (2017). Effects of sleep improvement on cognitive performance in adolescents with chronic sleep reduction: A randomized controlled trial. *Sleep Medicine*, 38, 14–22. <https://doi.org/10.1016/j.sleep.2017.06.014>
5. Kira, G., Glover, M., & Maddison, R. (2014). Interventions to improve sleep hygiene and duration in children and adolescents: A systematic review. *Sleep Medicine Reviews*, 18(5), 421–432. <https://doi.org/10.1016/j.smr.2014.02.004>
6. Nagaland Post. (2026, January 15). Growing concern over adolescent sleep deprivation in urban India. Nagaland Post.
7. Naqvi, S., Ahmad, S., & Khan, A. (2018). Study skills as predictors of academic performance among high school students. *International Journal of Educational Psychology*, 7(2), 112–128.
8. Paruthi, S., Brooks, L. J., D'Ambrosio, C., Hall, W. A., Kotagal, S., Lloyd, R. M., Malow, B. A., Maski, K., Nichols, C., Quan, S. F., Rosen, C. L., Troester, M. M., & Wise, M. S. (2016). Recommended amount of sleep for pediatric populations: A consensus statement of the American Academy of Sleep Medicine. *Journal of Clinical Sleep Medicine*, 12(6), 785–786. <https://doi.org/10.5664/jcsm.5866>
9. Putra, I. G. N. E., Sukrama, I. D. M., & Wihandani, D. M. (2023). Sleep quality and learning achievement among high school students in Denpasar: A cross-sectional study. *Bali Medical Journal*, 12(2), 1543–1548.
10. Sah, R. K., Rai, B., & Sharma, P. (2024). Sleep hygiene, circadian disruption, and academic outcomes among South Asian adolescents. *Asian Journal of Psychiatry*, 91, Article 103850. <https://doi.org/10.1016/j.ajp.2024.103850>
11. Saha, A., Roy, S., & Banerjee, P. (2026). Sleep irregularity and cognitive outcomes in Indian adolescents. *Indian Journal of Clinical Psychology*, 53(1), 34–42.
12. Sharman, R., & Illingworth, G. (2020). Adolescent sleep patterns, memory consolidation, and classroom performance: A neurodevelopmental perspective. *Educational Psychology Review*, 32(3), 689–711. <https://doi.org/10.1007/s10648-020-09528-0>
13. Singh, R. (2024). Dimensions of study skills as critical predictors of academic achievement. *Journal of Educational Research and Practice*, 14(1), 88–102.
14. Spilsbury, J. C., Drotar, D., Rosen, C. L., & Redline, S. (2007). The Cleveland Adolescent Sleepiness Questionnaire (CASQ): Test development and validation in standard and clinical populations. *Journal of Clinical Sleep Medicine*, 3(3), 261–267.
15. Thomas, M. L., Sing, H. C., Belenky, G., Holcomb, H. H., Mayberg, H. S., Dannals, R. F., Wagner, H. N., Thorne, D. R., Popp, K. A., Rowland, L. M., Welsh, A., Balwinski, S. M., & Redmond, D. P. (2014). Neural basis of alertness and cognitive performance impairments during sleep deprivation. *Journal of Sleep Research*, 23(4), 382–394. <https://doi.org/10.1111/jsr.12132>
16. Tynjälä, J., Kannas, L., & Välimaa, R. (1999). How young Europeans sleep: Health behaviour in school-aged children study. *Journal of Sleep Research*, 8(3), 173–180. <https://doi.org/10.1046/j.1365-2869.1999.00156.x>
17. Vijayabanu, C., & Sri, R. M. (2017). Development and standardization of the Study Skills Assessment Tool (SSAT) for secondary school students. *Indian Journal of Applied Psychology*, 54(2), 145–158.
18. Wang, Y., & Lu, X. (2025). Restorative sleep, attentional regulation, and scholastic performance in secondary education. *Learning and Individual Differences*, 118, Article 102420. <https://doi.org/10.1016/j.lindif.2025.102420>

19. Wikipedia (September, 2023) Information Processing Theory. https://en.wikipedia.org/w/index.php?title=Information_processing_theory&oldid=1177421922
20. Zhasa, M., CP, Prince., & Jamir, T. (2025). Cognitive function and learning efficiency in adolescent populations: A review. *Journal of Behavioral and Applied Psychology*, 8(1), 15–29.
21. Zhu, Y., Chen, H., & Liu, Z. (2024). Sleep patterns and prefrontal cortex executive control in adolescents. *Frontiers in Psychology*, 15, Article 1342105. <https://doi.org/10.3389/fpsyg.2024.1342105>
22. Zimmerman, B. J. (2015). Self-Regulated Learning: Theories, Measures, and Outcomes. *International encyclopaedia of the social & behavioural sciences*, 21(2), 541-546. <https://dx.doi.org/10.1016/B978-0-08-097086-8.26060-1>
23. Barker, K, Johnson, M, 2011, 'Musculoskeletal Provocative Maneuvers', In Cifu, D (ed.), Braddom's Physical Medicine and Rehabilitation, 5th edn, Elsevier, Philadelphia, pp.277-315.
24. Akbas, E., Usgu, Serkan. (2026). Low Back Pain In Geriatric Patients: Clinical Features, Causes, And Management Options. *Turkish Journal of Geriatrics*. 29. 10.29400/tjgeri.2026.504.
25. Falowski, Steven., Sayed, Dawood, et al. (2020). A Review and Algorithm in the Diagnosis and Treatment of Sacroiliac Joint. *Journal of Pain*, 3337-3345. <http://doi.org/10.2147/JPR.S279390>.
26. Yoshihara H. Sacroiliac joint pain after lumbar/lumbosacral fusion: current knowledge. *Eur Spine J*. 2012;21(9):1788–1796. doi:10.1007/s00586-012-2350-8 5.
27. Cher D, Polly D, Berven S. Sacroiliac joint pain: burden of disease. *Med Devices*. 2014;7(1):73–81. doi:10.2147/MDER.S59437 7.
28. Guentchev M, Preuss C, Rink R, Peter L, Wocker E-L, Tuettenberg J. Technical note: treatment of sacroiliac joint pain with peripheral nerve stimulation. *Neuromodulation*. 2015;18(5):392–396. doi:10.1111/ner.12255 6.
29. Stoop, Annerieke., Lette, Manon., et al. (2019). Comprehensive Geriatric Assessment in Integrated Care Program for Older People Living at Home : A Scoping Review. *Review Article*, 549-563. wileyonlinelibrary.com/journal/hsc. DOI: 10.1111/hsc.12793
30. Tsoi C, Griffith JF, Lee RKL, Wong PCH, Tam LS. (2019). Imaging of sacroiliitis: current status, limitations and pitfalls. *Quant Imaging Med Surg*.9(2):318–335. doi:10.21037/qims.2018.11.10.
31. Battistone MJ, Manaster BJ, Reda DJ, Clegg DO. (1999). The prevalence of sacroilitis in psoriatic arthritis: new perspectives from a large, multicenter cohort. *A Department of Veterans Affairs Cooperative Study. Skeletal Radiol*.28:196-201.
32. Jiang, Shantong., Pingping, Li., (2016). Current Development in Elderly Comprehensive Assessment and Research Methods. *BioMed Research International Volume 2016*, Article ID 3528248, 10 pages <http://dx.doi.org/10.1155/2016/3528248>.
33. Milanese, S., Beard, M., Jarrett, M. (2022). Oswestry Disability Index Scores and the Relationship to Age, Gender and Diagnosis in a Cohort of Patients with Low Back Pain. *Journal of Spine Research & Reports*. 1. 1. 10.47363/JSRR/2022(1)106.
34. Beauchet, O., Fantino, B., Allali, G., Muir, S.W, Montero-Odasso, M., Annweiler, C. (2011). Timed up and go test and risk of falls in older adults: A systematic review. *The Journal of nutrition, health and aging*. 15. 933-938. 10.1007/s12603-011-0062-0