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Healthy Sleep Habits: A Cornerstone of Student Success

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Abstract

Sleep is an essential part of our life. Good sleep improves productivity, quality of life, and social outcomes like academic and work performance. However, the demands of modern lifestyles, including academics, sports, social activities, and physical changes during adolescence, can disrupt adolescent sleep patterns. This study aims to examine the relationship between sleep duration, sleep quality, and academic performance in students aged 14–18 years. Methodology: This study examined the sleep behaviors and academic performance of high school students aged 14–18 in the greater Boston area. A questionnaire assessed sleep duration, quality, time to fall asleep, daytime sleepiness, and the voluntary or involuntary nature of sleep deprivation. Participants also reported demographic details, including age, gender, and grade, and rated their school performance and its perceived connection to sleep. Data was analyzed using jamovi 2.3.28, with descriptive statistics summarizing variables as percentages. A Chi-square test was used to explore associations between sleep variables and academic performance. Results indicate that the study included 36 respondents, all of whom completed the survey. Participants comprised 53% male, 42% female, and 6% gender-neutral students. Sleep duration was reported as ≤7 hours (50%), 7–8 hours (33%), and greater than 8 hours (17%). Sleep duration was primarily influenced by mandatory schoolwork (44%) and discretionary activities (39%), with fewer citing health-related reasons or environmental factors (17%). In conclusion the study found no significant association between sleep quality, sleep duration, or daytime sleepiness and academic performance. Participants with poor sleep quality experienced more daytime sleepiness.

Keywords: Sleep Duration, Sleep Quality, Daytime Sleepiness, Academic Performance

1. Introduction

Sleep is one of the three pillars of health along with nutrition and movement. Adequate and appropriate sleep is necessary for both physical and mental health. Healthy sleep can not only improve overall productivity and quality of life but can influence many social outcomes such as performance at school and work. The sleep requirement for humans varies across the lifespan, from children to adults. Newborns require the most sleep, needing around 14 to 17 hours per day. The duration of sleep required decreases with age. Preschoolers require around 10 to 13 hours of sleep, adolescents need 8 to 10 hours, and adults typically need 7 to 8 hours of sleep per day (Hirshkowitz et al., 2015).

Data from the US Department of Health and Human Services, Office of Disease Prevention and Health Promotion, reveals a concerning trend in sleep behavior among children. In contrast to 2017, when 25.4% of students in grades 9 through 12 got sufficient sleep on an average school night, in 2021, this figure had dropped to 22.7%. The target is to have 27.4% of students in these grades achieve eight or more hours of sleep per night.

Today's rapidly changing lifestyle is characterized by using electronic gadgets, social media platforms, and constant exposure to content, affecting our ability to disconnect and impacting our sleep. Furthermore, there are various lifestyle factors that can affect sleep in adolescents, including academic work, sports training, extracurricular activities, late-night TV watching, early morning wakeups for school, part-time jobs, and the use of alcohol or other

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substances. High school is a particularly challenging period due to the demands of academics, sports, and social life, alongside the physical changes of adolescence. This is when adolescents need constant reminders of the three pillars of health.

Among adolescents, understanding sleep-related problems or Behaviorally Induced Insufficient Sleep Syndrome (BIISS) is a key concept. BIISS is a sleep disorder in which adolescents and adults consistently fail to get enough sleep due to lifestyle choices or habits, rather than medical issues. This can happen for both voluntary and involuntary reasons, such as staying up late to watch a movie or catching up on schoolwork. Over time, this sleep deprivation results in excessive daytime sleepiness, difficulty focusing, mood changes, and reduced productivity. The issue isn't the inability to sleep, but rather a lack of prioritization of adequate sleep. BIISS is marked by excessive sleepiness during the day, short habitual sleep durations, and significantly longer sleep periods on weekends or during vacations. Importantly, the shortened sleep duration in BIISS is voluntary and not due to health-related or environmental factors. However, this consistent reduction in sleep can have significant negative impacts on both health and academic/work performance. A study conducted among 989 college students in the United States found that 9.9% of participants had BIISS. The subjects included 647 female students, 332 male students, and 6 students who chose not to disclose their gender. Most of the students (97.78%) were aged 20 and 21. In this study, BIISS was defined as having 6.5 hours or less of sleep per night, with no impairment in sleep quality or onset and maintenance. The reduced sleep duration was voluntary. Plus, experiencing daytime sleepiness at least once per week was a criterion for BIISS. Among the students, 16.9% reported daytime sleepiness once or twice a week, and 5.1% reported experiencing it three or more times a week. The study further found that depressive symptoms were more common in students with BIISS compared to those with normal sleep patterns (Williams et al., 2019).

Research has further shown a connection between sleep and cognitive function; however, studies have reported inconclusive findings regarding the impact of sleep measures on students and academic performance. Most studies which revealed an association between sleep and academic performance explored sleep related physical disorders like obstructive breathing (Sutay et al., 2022).

In addition to medical problems, many social and environmental factors can affect adolescent sleep behavior. An Australian study investigating the link between academic performance and adherence to sleep guidelines found no significant association between meeting the recommended sleep duration and academic performance (Howie et al., 2020).

The Deporte, ADOlescencia y Salud (DADOS) study which explored the association between sleep duration and quality, both objectively measured, and self-reported to academic performance and cognitive ability also revealed contradictory results. The study reported no association with sleep duration to either academic or cognitive performance. However, the study reported an association between subjective sleep quality and academic performance. There was no association found between objective sleep quality and academic performance. While it is widely recognized that sleep impact's cognitive function, its direct effect on academic performance remains inconclusive. Most studies concluding a relationship between sleep and academic performance have focused on individuals with sleep-related disorders. More studies are needed in this area to get a better understanding of the relationship between sleep and academic performance. The author aims to investigate the causes of sleep issues among adolescents and examine the relationship between sleep duration, sleep quality, and academic performance in students aged 14–18 years (Adelantado-Renau et al., 2019).

Objective: To assess the relationship between sleep duration, quality, and academic performance among students aged 14–18 years.

2. Materials & Method

This study was conducted among High School aged students in the greater Boston area of Massachusetts. High School students ranging from the age of 14 to 18 were included in this study. A questionnaire was developed and socialized with High School students to assess their sleep activity and resulting effects on their daily routine and academic performance. To capture the demographic characteristics of the participants, the questions required students

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to answer questions on age, gender and the grade they are in. Questions to assess the sleep variables included hours of sleep they get per night, quality of sleep they think they get per night, and time taken to fall asleep per night. To assess their sleep behavior and its impact on daytime function, students were asked about the frequency of daytime sleepiness over the past month.

Additionally, questions aimed to determine whether their lack of sleep was voluntary or involuntary, focusing on sleep duration and its connection to mandatory schoolwork or discretionary activities. The survey concluded by asking students to rate their school performance and whether they believed it was influenced by their sleep habits.

Data analysis was done using jamovi 2.3.28 statistical software, descriptive statistics were used to calculate the percentage for each variable, and the findings were expressed in percentages. Further, a Chi-square test was conducted to examine the association between sleep variables and academic performance.

Ethical considerations were addressed throughout the study. Participation was voluntary, and students were informed about the purpose of the research and how their data would be used. Implicit permission was obtained from the students, ensuring that participants were aware of their rights, including the option to withdraw at any time. Measures were taken to protect the confidentiality and anonymity of all participants, with responses securely stored and used only for research purposes. These safeguards ensured that the study was conducted responsibly and respectfully.

3. Results

There was a total of 36 respondents and all of them completed the survey, none of them skipped a question and the average time taken was 48 seconds. Among the participants there were 53% of male, 42% of female and 6% gender neutral students. 16 (44.4%) Sophomore (Grade 10) and 13 (36.1%) Junior (Grade 11) students participated in the survey as compared to the 2 (5.6%) Freshman (Grade 9) and 5 (13.9%) Seniors (Grade 12). As shown in Figure 1, 18 (50%) of the participants slept 7 hours or less, 12 (33%) slept 7 to 8 hours and 6 (16.7%) slept more than 8 hours.

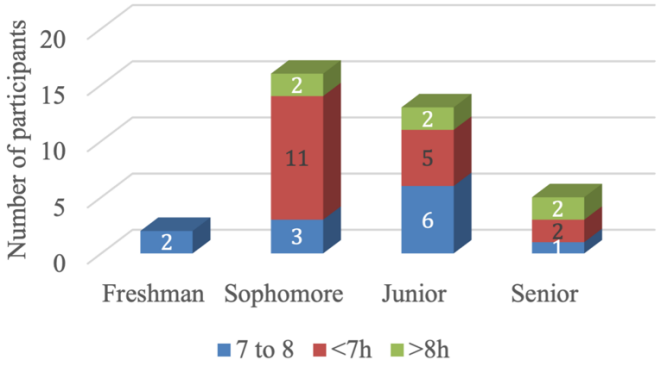

Figure 1. Sleep duration of participants.

Coming to the quality of sleep, 21 (58.3%) students opined that they sleep well, 11 (30.6%) thought they did not sleep well, and 4 (11.1%) thought they slept very well. 15 (41.7%) of the students answered they slept within 20 minutes, and 14 (38.9%) of the students slept within 20 to 40 minutes and 3 (8.3%) slept between 40 to 60 minutes and 4 (11%) answered that they took above 60 minutes to fall asleep. Duration of sleep for most participants was determined by mandatory schoolwork and after school activities for 16 (44%), followed by discretionary activities for about 14 (38.9%) of participants and 6 (16.7%) had health related reasons and environmental factors.

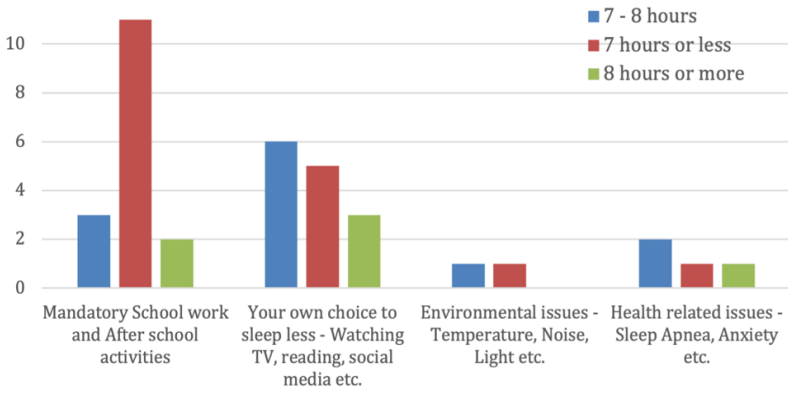

Figure 2. Reasons for sleep deprivation among participants

Figure 2 shows that the primary reason for students sleeping 7 hours or less is mandatory schoolwork or extracurricular work or sports.

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Students answering the question on their performance at school, 17 (47.2%) of the students responded that their performance was below their expectation, 12 (33.3%) of students said they performed per their expectations and 7 (19.4 %) answered that their performance was above their expectations.

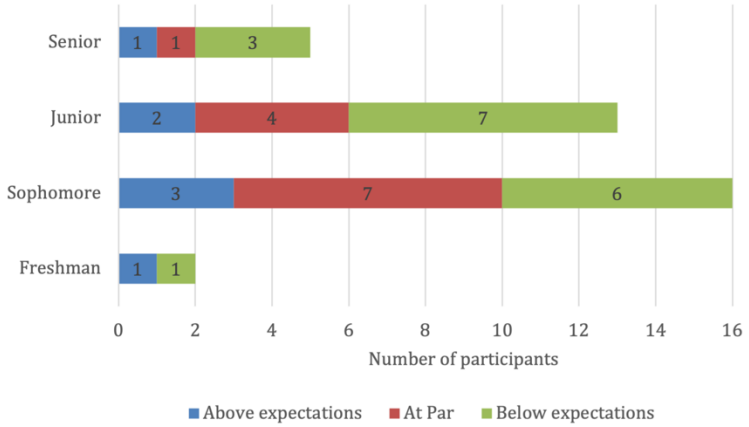

Figure 3. Academic Performance

To find out the association between sleep related variables and academic performance, a chi square test was used. No significant relationship was found between sleep duration and self-reported academic performance as shown in Table 1.

Table 1. Sleep Duration and Self-reported Academic Performance

Sleep Duration	Per or above the student's expectation of academic performance	Below student's expectation of academic performance	χ^2 value	df	P
More than 7 hours	9(50)	9(50)	0.111	1	0.738
7 hours or less	10(55.6)	8(44.4)			
Total	19	17			

Table 2 shows the relationship between sleep duration and its effects on academic performance as perceived by the students themselves.

There was no statistically significant relationship between the sleep duration and its effect on academic performance as perceived by the students themselves with a p value of 0.393.

Table 2. Association between Sleep Duration and Perceived effect on Academic performance

Sleep duration	Affects academic performance	Does not affect academic performance	Unknown	χ^2 value	df	P
More than 7 hours	8(44.4)	4(22.2)	6(33.3)	1.87	2	0.393
7 hours or less	12(66.7)	2(11.1)	4(22.2)			
Total	20	6	10			

There was no statistically significant relationship between sleep quality and self-reported academic performance with a p value of 0.429 as shown in Table 3.

Table 3. Sleep Quality and self-reported Academic Performance

Sleep Quality	Per or above the student's expectation	Below student's expectation	χ^2 value	df	P
Well	11(47.8)	12(52.2)	0.627	1	0.429
Not well	8(61.5)	5(38.5)			
Total	19	17			

Table 4 shows the relationship between Sleep Quality and its effects on school performance as perceived by the students themselves.

No significant relationship was found between the sleep quality and its effect on academic performance as perceived by the students themselves (p value of 0.641).

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Table 4. Sleep Quality and Perceived effect on Academic performance

Sleep Quality	Affects academic performance	Does not affect academic performance	Unknown	χ^2 value	df	P
Well	14(60.9)	3(13)	6(26.1)	0.891	2	0.641
Not well	6(46.2)	3(23.1)	4(30.8)			
Total	20	6	10			

Table 5 shows the relationship between Sleep Duration and Day Time Sleepiness. There was no significant relationship between the Sleep Duration and Day Time Sleepiness with Fisher's exact Test p value of 0.082.

Table 5. Sleep Duration and Day Time Sleepiness

Sleep Duration	2-3 times per week	3 or more times per week	χ^2 value	df	P
More than 7 hours	9(50)	9(50)	3.01	1	0.082
7 hours or less	4(22.2)	14(77.8)			

All the participants who reported that the sleep quality was not well, had daytime sleepiness of more than 3 times/week, hence chi square was not performed. The poor sleep quality was significantly associated with excessive day time sleepiness as shown in Table 6, Fisher's exact test p value being <0.001.

Table 6. Sleep Quality and Day Time Sleepiness

Sleep Quality	2-3 times per week	3 or more times per week	total	χ^2 value	df	P
Well	13 (56.5)	10 (43.5)	23	11.5	1	< 0.001
Not well	0	13(100)	13			
Total	13	23	36			

No significant association was found between daytime sleepiness and academic performance as the p value was 0.59 as shown in Table 7.

Table 7. Day Time Sleepiness and Academic Performance

Day time sleepiness	Per or above the student's expectation	Below student's expectation	χ^2 value	df	P
2-3 times per week	7(53.8)	6(46.2)	0.009	1	0.59
3 or more times per week	12(52.2)	11(47.8)			
Total	19	17			

4. Discussion

The current study explored the relationship between sleep habits and academic performance. The results revealed that there was no significant association between sleep duration and academic performance among high school students. A study conducted in Japan among students from grades 5 to 12 also reported similar results (Åkerstedt et al., 2022). An Australian study also revealed that meeting behavioral guidelines on sleep duration did not find association with academic performance in school children (Pallesen et al., 2011). A study from India on sleep patterns, reasons for sleep problems and academic performance which showed that sleep duration was not statistically associated with current academic performance (Sutay et al., 2022). These unexpected results from studies might be due to the fact that though the sleep duration of school children falls below the guidelines, it is not as poor as students attending college. The current study also categorized sleep duration to 7 hours or less, 7-8 hours and 8 hours or more. The exact duration of sleep was not measured objectively in this study. The studies which find an association between sleep duration and academic performance were conducted among college students and it measure the actual sleep duration using an activity tracker (Okano et al., 2019). Another study which found an association between sleep duration and academic performance was conducted among students in the age group 14 -15. This study also calculated the sleep duration from bedtimes and wake up times.

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The present study did not show any significant association between sleep quality and academic performance. This result is not consistent with other studies which reported a significant association between sleep quality and academic performance. The inconsistency in the result might be due to the fact that this study rated sleep quality categorically into very well, well and not well. Other studies that reported association between sleep quality and academic performance rated sleep quality using Pittsburgh Sleep Quality Index and taking the cutoff value as 5; a total score less than 5 is good sleep and a total score more than and equal to 5 is poor sleeper. This final cutoff value was reached considering many components of sleep together. A study conducted in Chile reported a significant inverse association between The Pittsburgh Sleep Quality Index and secondary school student's academic performance. However, in this study, the component sleep efficiency when taken independently was not found to have significant association with academic performance (Bugueno et al., 2017). Another research which also revealed an association between sleep quality and academic performance used the Pittsburgh Sleep Quality Index (El Hangouche et al., 2018). A study among college students found that sleep-related factors such as quality, duration, and consistency accounted for approximately 25% of the variance in academic performance. This relationship was observed when sleep patterns were analyzed over the month or week leading up to exams. However, no correlation was found between academic performance and sleep quality or duration when considering only the night before the exam (Okano et al., 2019).

No significant association was found between daytime sleepiness and academic performance in the current study. Other studies also reported similar findings. A study from Jordan reported that though sleep quality had significant association with academic performance, there was no significant association between daytime sleepiness and academic performance (Alqudah et al., 2022), another study among university students also reported no significant association between daytime sleepiness and academic performance (Alshamoosi et al., 2020).

The sleep duration in the current study was determined by mandatory schoolwork in most participants (44%) followed by discretionary activities (39%) and health related reasons and environmental factors (17%). A study from India reported that study related reasons (32.6%) and social media usage (21.7%) as the reason for sleeping less (Sutay et al., 2022). There was no significant association between sleep duration and daytime sleepiness, however sleep quality was significantly associated with daytime sleepiness. A study conducted among women reported modest association between sleep efficiency and daytime sleepiness, however it did not find any association between total sleep time and daytime sleepiness (Åkerstedt et al., 2022). A study among medical students in Pakistan reported that 37.7% of students with poor sleep quality experienced day time sleepiness (Maheshwari et al., 2019).

5. Conclusion

The present study conducted for high school students revealed that fewer high school students get average hours of sleep. The primary reason for getting less sleep in high school students is mandatory schoolwork and after-school activities. The study further revealed that students with "above expectations" academic performance get average hours whereas students with less than the average 7 to 8 hours of sleep were more likely to have daytime dysfunction and lower productivity resulting in an academic performance that does not meet their own expectation. Though this study found no significant association between sleep quality, sleep duration, or daytime sleepiness and academic performance. Participants with poor sleep quality experienced more daytime sleepiness. Therefore, increasing awareness regarding the problems that can happen due to insufficient sleep in the arenas of physical health, mental health, and academic performance and implementing healthy sleep habits from an earlier age onwards is highly necessary in this rapidly changing world, especially among adolescents.

6. Research limitations

The study of sleep habits among high school students had several limitations. It was conducted in randomly selected schools across various towns, using a small sample size. Consequently, the study sample may not adequately represent all high school students across New England, particularly as it did not account for demographic variations such as age, gender, socioeconomic status, or cultural differences that could influence sleep habits. This geographic limitation also means findings may not be generalizable to high school students in other regions with different social,

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economic, or educational contexts, potentially introducing sampling bias.

Additionally, the study did not differentiate between weekdays and weekends, which could lead to data anomalies. The impact of various health conditions and sleep disorders was not included in the analysis, further limiting the understanding of how these factors influence students' sleep habits and academic performance.

References

Adelantado-Renau, M., et al. (2019). Associations between objectively measured and self-reported sleep with academic and cognitive performance in adolescents: DADOS study. *Journal of Sleep Research*, 28(4), e12811. https://doi.org/10.1111/jsr.12811

Åkerstedt, T., et al. (2022). Total sleep time, sleep efficiency and next day subjective sleepiness in a large group of women. *SLEEP Advances*, 3(1). https://doi.org/10.1093/sleepadvances/zpac028

Alqudah, M., et al. (2022). Daytime Sleepiness among Medical Colleges' Students in Jordan: Impact on Academic Performance. *Sleep Disorders*, 2022(1), 1–7. https://doi.org/10.1155/2022/7925926

Alshamoosi, M., et al. (2020). Sleep pattern and dozing chance among university students. *Journal of Family Medicine and Primary Care*, 9(12), 6249. https://doi.org/10.4103/jfmpc.jfmpc_941_20

Bugueño, M., et al. (2017). Calidad de sueño y rendimiento académico en alumnos de educación secundaria. *Revista Médica de Chile*, 145(9), 1106–1114. https://doi.org/10.4067/s0034-98872017000901106

El Hangouche, A. J., et al. (2018). Relationship between poor quality sleep, excessive daytime sleepiness and low academic performance in medical students. *Advances in Medical Education and Practice*, Volume 9(9), 631–638. https://doi.org/10.2147/amep.s162350

Hirshkowitz, M., et al. (2015). National Sleep Foundation's sleep time duration recommendations: methodology and results summary. *Sleep Health* 1(1), 40–43. https://doi.org/10.1016/j.sleh.2014.12.010

Howie, E. K., et al. (2020). Associations between meeting sleep, physical activity or screen time behaviour guidelines and academic performance in Australian school children. *BMC Public Health*, 20(1). https://doi.org/10.1186/s12889-020-08620-w

Maheshwari, G., & Shaukat, F., (2019). Impact of Poor Sleep Quality on the Academic Performance of Medical Students. *Cureus*, 11(4). https://doi.org/10.7759/cureus.4357

Okano, K., et al. (2019). Sleep quality, duration, and consistency are associated with better academic performance in college students. *Npj Science of Learning*, 4(1). https://doi.org/10.1038/s41539-019-0055-z

Pallesen, S., et al. (2011). Behaviorally induced insufficient sleep syndrome in older adolescents: Prevalence and correlates. *Journal of Adolescence*, 34(2), 391–395. https://doi.org/10.1016/j.adolescence.2010.02.005

Sutay, S. S., et al. (2022). Sleep Patterns, Issues, Reasons for Sleep Problems, and Their Impact on Academic Performance among First-Year Medical Students in Central India. *Maedica*, 17(1), 97–102. https://doi.org/10.26574/maedica.2022.17.1.97

Williams, A. B., et al. (2019). Insomnia Disorder and Behaviorally Induced Insufficient Sleep Syndrome: Prevalence and Relationship to Depression in College Students. *Behavioral Sleep Medicine*, 18(2), 275–286. https://doi.org/10.1080/15402002.2019.1578772