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Sleep and study: The role of sleep habits and nighttime smartphone use in the academic performance of high school students in Mexico

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Abstract

Do high school students sleep adequately? This was the question that motivated our research team to investigate the sleep habits of students, specifically those at a rural high school located in the San Andrés Xiutetelco region of the state of Puebla, Mexico. We started with a preliminary hypothesis that suggested two possible causes of sleep disorders: on the one hand, the perceived difficulty of the curriculum; on the other, excessive smartphone use at night, influenced by local socioeconomic factors. To test this hypothesis, we designed a diagnostic instrument that was administered to a sample composed of incoming and final-semester students. As a first step, we gave an introductory talk aimed at providing a basic understanding of sleep and its impact on academic performance, as well as clarifying some key concepts. Subsequently, a survey focused on sleep habits and their relationship with academic performance was administered. Upon analyzing the collected data, our hypothesis was partially confirmed: a high percentage of the students surveyed reported using their cell phones before bed, which was associated with lower academic performance.

Keywords: Dream; Academic Performance; High School Graduate; Academic Achievement; High School Graduate; Xiutetelco; Puebla; Mexico

1. Introduction

During the summer 2025 term, in the subject "Demographic Methods" of the Bachelor's Degree in General and Community Medicine of the Northeastern Regional Complex, Teziutlan campus, of the Benemerita Universidad Autonoma de Puebla, students of the Generation 2024 carried out a research with fieldwork at the Official General Baccalaureate "Sor Juana Inés de la Cruz", with code C.C.T. 21EBHO845N, located in San Andrés Xiutetelco, Puebla. The activities carried out included obtaining informed consent from parents, designing and testing data collection instruments, administering surveys, as well as explaining to students the importance of sleep habits and their relationship with academic performance.

The entire process was supervised by the teacher in charge of the course, who ensured that both academic and community objectives were met. Support was also provided by the teachers in charge of the groups and the high school administration. This study was observational, cross-sectional, and non-experimental, and aimed to analyze how a good sleep cycle can influence academic performance. Getting enough sleep not only improves memory and concentration but it's also linked to better emotional and physical health. Recent studies [1-3] show how 7 and 8-year-old children with sleep deficiencies or sleep-related problems suffer a higher incidence of attention problems and impulsivity. This

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initiative sought to raise awareness about the importance of sleep in student life and provide useful information and strategies to improve this habit within the school community.

The current lifestyle, characterized by technology, screens, a fast-paced lifestyle, and socioeconomic factors, has altered the sleep patterns of millions of people. Thanks to advances in understanding the neurobiological mechanisms of sleep, it is known that this is a fundamental and decisive biological process in maintaining physical, mental, and emotional health. Despite numerous studies on this topic, there is still a lack of knowledge regarding sleep disorders and their short- and long-term effects, as is the case with the population of second- and sixth-semester high school students at the Sor Juana Inés de la Cruz Institution, located in a community in Teziutlan, Puebla.

The relevance of this research is that it is focused on providing results that serve as valuable evidence not only in the scientific field but also for parents, teachers, and health professionals seeking guidance to achieve the best well-being for adolescents. It is well known that high school students who attend morning classes tend to struggle with maintaining healthy sleep habits, which can often lead to the development of various sleep disorders.

We hope that the results obtained in this research will serve as a starting point for designing different school strategies, guidance programs, and various measures to guide young people toward healthy sleep habits that will benefit them in all aspects of their lives, not just academically. By focusing on this age group and using a specific approach that utilizes a comprehensive approach and a questionnaire on sleep habits, we hope to generate evidence that will serve as a basis for future school or community interventions aimed at promoting better sleep hygiene practices, promoting the overall well-being of students, and strengthening their academic performance. This information is especially relevant in settings where social and economic conditions can exacerbate sleep problems in the student population.

2. Theoretical Framework

Sleep plays essential roles in brain development, memory consolidation, and emotional regulation—fundamental processes during adolescence, a stage marked by biological and social changes that tend to delay natural sleep schedules. However, factors such as homework, late-night use of electronic devices, and early school hours mean that most adolescents do not get the recommended 8 to 10 hours of sleep [1-2].

Lack of sleep is a common problem among adolescents and has direct consequences for their academic performance. Sleep deprivation negatively affects academic performance in several ways: adolescents with sleep deprivation often experience increased daytime sleepiness, difficulty concentrating, a decreased ability to retain information, and more errors on complex tasks.

Furthermore, lack of sleep impacts mood, increasing irritability and reducing motivation, which can lead to a vicious cycle of inferior performance and disinterest in school. Scientific evidence shows that sleep deprivation not only lowers grades but also increases the risk of mental health problems, such as anxiety and depression, and impairs decision-making and behavioral regulation [1] [3].

Recent studies have shown that sleep deprivation affects specific brain regions related to memory and learning. For example, Urrila et al. [4] found that adolescents who do not get enough sleep on weekends have lower academic performance because the lack of rest impairs the ability to retain information in short-term memory. This forces students to dedicate more time to studying, generating even more sleep deprivation and negatively affecting the brain structures involved in memory [4].

Sleep-wake regulation depends on two main neural systems: the ascending activating system and the basal forebrain, which activate the cerebral cortex and other regions through.

Neurotransmitters such as norepinephrine, dopamine, serotonin, histamine, glutamate, and acetylcholine. The increased drive to sleep after prolonged periods of wakefulness, followed by deeper sleep, demonstrates the existence of a homeostatic mechanism regulated in part by adenosine [9]. This neurotransmitter, when accumulated, inhibits brain regions that induce awakening and promote sleep, a mechanism that can be blocked by caffeine [5].

Among the main sleep disorders in adolescents are insufficient sleep, sleep-disordered breathing (such as obstructive sleep apnea syndrome), narcolepsy, insomnia, sleepwalking, night terrors, and circadian rhythm disorders. Several studies have shown that sleep-disordered breathing in childhood not only compromises respiratory health but also negatively influences cognitive development and academic performance. These disturbances disrupt the quality and quantity of sleep, affecting essential executive functions such as attention, memory, and concentration [6-7].

Finally, it is recommended to promote sleep hygiene, limit screen use before bedtime and consider school policies that delay the start of school to promote adequate rest and, consequently, better academic performance [7]. Good sleep is essential for adolescents to reach their full academic and emotional potential. Recognizing and addressing sleep deprivation should be a priority for both families and educational institutions [1] [3].

3. Methodology

3.1. Study Design

This research was carried out under a descriptive design, focusing on the sleeping hours of second and sixth semester high school students. This allowed us to collect concise data on their sleep schedules and identify the main problems that arose; and once we knew this, we could identify the main factors that caused it. The reason this research design was chosen was so the students could tell us how many hours they sleep during the day, letting us know how many hours they sleep daily, what they think happens to their bodies when they get too little sleep, and the factors that could cause it. Based on all this information, we could have a starting point for developing strategies and sharing them not only with them, but also with parents and teachers.

3.2. Sample Description

The sample for this study consisted of a total of 53 second- and sixth-semester high school students, aged 16, 17, and 18. Of the participants, 27 were women (50.98%) and 26 were men (49.02%), distributed across different academic groups. Specifically, 27 belonged to the first-year group, Group A, and the remaining 26 to the third-year group, Group A. This distribution allowed for a balanced representation of the different academic levels, which facilitated a comprehensive assessment of sleep habits and the impact of increased academic loads. Thus, a broader view was obtained on the importance of maintaining an adequate sleep cycle for academic performance, both inside and outside the classroom.

3.3. Methodological Tools

During this research, various instruments were used to collect all the necessary information. As a first activity, a presentation was created; the content of the presentation was based on published scientific articles related to sleep, some sleep disorders, and how technology and screens influence circadian rhythms. Afterwards, a fun and educational activity was held for the students. This activity consisted of the famous traditional Mexican game "hot potato." The students had to pass a balloon around, and whoever was left with the balloon at the end of the game had to break it. Inside the balloon was a piece of paper containing a question related to the topic that they had to answer. The game was a success, allowing us to know that the students fully understood the topics by correctly answering all the questions. Finally, we conducted a questionnaire on the Forms Office platform. The questionnaire included questions related to their sleep patterns and certain knowledge about the topic.

3.4. Data collection procedure

This study was conducted on June 16 and 17, 2025, as part of the “Demographic Methods MFCS-014” course for the Bachelor's Degree in General and Community Medicine at the Northeastern Regional Complex of the Benemerita Universidad Autonoma de Puebla. Students from the 2024 class enrolled in NRC 42979 conducted a research project at the "Sor Juana Ines de la Cruz" High School, located in San Andres, San Juan Xiutetelco, Puebla.

During the time the research was conducted, it covered several sections. We analyzed the direction of the research in the classroom; once this was defined, we began to identify the methodological methods to be used for our work. First, we visited the institution to obtain informed consent. We informed the director about the focus of our work and how it would benefit her students by teaching them the importance of their sleep routines.

We then developed our Forms instrument and piloted it with five students to refine it. Once everything was in optimal condition, we visited the institution on June 16th to administer the instrument. We visited two diverse groups, the second and sixth semesters, with the intention of comparing the differences between a student who had just entered and one who was about to leave.

Note: The graph shows students in one group answering a 10-question questionnaire about sleep quality and quantity and academic performance.

Figure 1 Data collection; questionnaire administration

4. Results

The results show that a generous portion of participants tend to go to bed late during the week, with a predominance of bedtimes after 10 p.m. (43.4% between 10 and 11 p.m., 28.3% after 11 p.m.). Regarding the feeling of rest upon waking, a large majority report feeling rested only sometimes (58.5%), indicating some irregularity in their sleep quality. Regarding sleep difficulties, a few report rarely (47.2%) or occasionally (30.2%) have trouble falling asleep or waking up during the night, although 17% experience this frequently.

Furthermore, the use of electronic devices before bed is common: most use them always (32.1%), almost always (30.2%), or sometimes (32.1%), which could influence the quality of their sleep. Regarding daytime sleepiness, almost half report feeling sleepy sometimes (49.1%). Napping is infrequent, as most do not do so (43.4%) or sleep less than 30 minutes (30.2%).

Finally, the overall perception of sleep quality is mostly positive, with scores between 7 and 8 (23% and 38% respectively), although some variability it´s observed. These results reflect the importance of fostering good sleep habits to improve well-being and daily performance.

Table 1 What time do you usually go to bed on weekdays?

	Frequency	Percentage	Cumulative Percentage
Before 9 pm	5	9.4%	9.4%
Between 9 and 10 pm	10	18.9%	28.3%
After 11 pm	15	28.3%	56.6%
Between 10 and 11 pm	23	43.4%	100%
Total	53	100%	

Note Many respondents (43.4%) report going to bed between 10 and 11 pm, which represents a nocturnal habit that could be linked to school lifestyle, homework, use of electronic devices, or social activities. This is followed by 28.3% who go to bed after 11 pm, further exacerbating the sleep pattern mismatch. Only 9.4% maintain an early bedtime schedule (before 9 pm), while 18.9% do so between 9 and 10 pm. This distribution shows that more than 70% of students go to bed after 10 pm, which can be a determining factor in the quality of their rest, affecting alertness, concentration in class, and academic performance. The habit of going to bed late during the week could also be associated with sleep disorders such as chronic sleep deprivation or excessive daytime sleepiness.

Table 2 Do you feel rested when you wake up in the morning?

	Frequency	Percentage	Cumulative Percentage
Never	1	1.9%	1.9%
Hardly ever	4	7.5%	9.4%
Always	7	13.2%	22.6%
Almost always	10	18.9%	41.5%
Sometimes	31	58.5%	100%
Total	53	100%	

Note: 58.5% of the students surveyed responded that they “sometimes” feel rested upon waking, reflecting an ambiguous or variable perception of rest. Only 13.2% reported feeling rested “always” and 18.9% “almost always,” for a total of 32.1% who report constant or frequent rest. On the other hand, 7.5% responded “almost never” and 1.9% “never,” indicating that approximately 1 in 10 students experience almost no rest upon waking. These results suggest a possible impact on sleep quality, derived from irregular bedtime schedules, academic stress, or poor sleep hygiene. A low perception of rest can directly impact attention, mood, and study motivation, in addition to posing a long-term risk to students' physical and mental health.

Table 3 How often do you have difficulty falling asleep?

	Frequency	Percentage	Cumulative Percentage
Never	3	5.7%	5.7%
Almost always	9	17.0%	22.6%
Sometimes	16	30.2%	52.8%
Rarely	25	47.2%	100%
Total	53	100%	

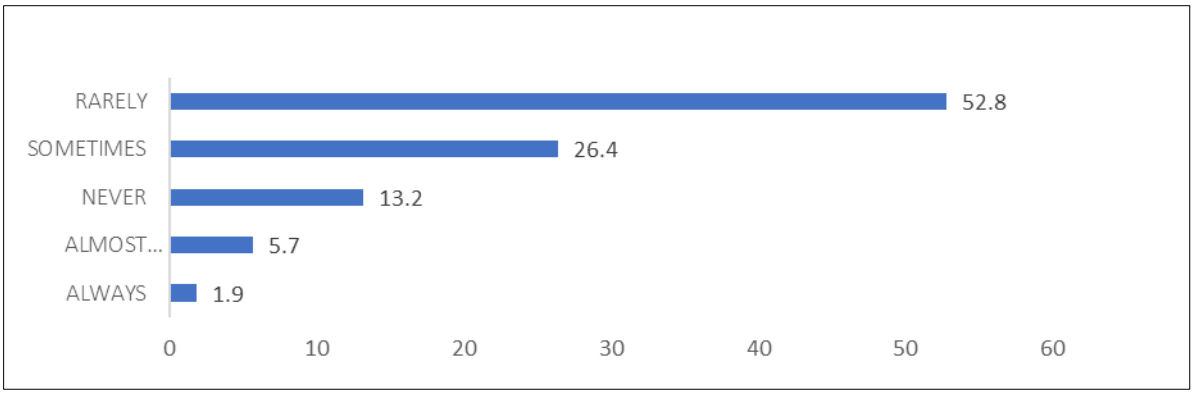
Note: 47.2% report "rarely" having difficulty falling asleep, and 30.2% "sometimes." Only 17% "almost always" and 5.7% "never" have this problem. This indicates that, although the majority do not frequently have difficulty falling asleep, a significant percentage do experience it occasionally.

The fact that nearly half of the respondents reported sleep-onset difficulties ("sometimes" or "almost always") may be indicative of potential contributing factors that influence sleep preparation, such as academic stress, pre-bedtime smartphone use, or irregular bedtimes. Being cognizant of those habits is important. If the occasional sleep-onset difficulties are neglected, they may develop into, more frequent or chronic sleep-onset disorders, without any preventive or intervention techniques being implemented to reduce the habits, such as sleep hygiene education, stress management strategies, or limiting screen time just prior to bed.

Table 4 Do you feel stressed or anxious when sleeping?

	Frequency	Percentage	Cumulative Percentage
Almost always	3	5.7%	5.7%
Never	15	28.3%	34.0%
Rarely	15	28.3%	62.3%
Sometimes	20	37.7%	100%
Total	53	100%	

Note: 37.7% experience stress or anxiety "sometimes" while sleeping, 28.3% "rarely," 28.3% "never," and only 5.7% "almost always." Most don't experience it regularly, but 4 in 10 experience it occasionally, which can affect sleep quality.



Note: More than half of respondents (52.8%) indicated that they rarely wake up during the night with difficulty falling asleep, a positive finding that suggests the majority do not experience this sleep disruption regularly. However, 26.4% responded that this occurs "sometimes," representing a significant proportion of students who occasionally experience sleep continuity issues.

Figure 2 Do you wake up during the night and have trouble getting back to sleep?

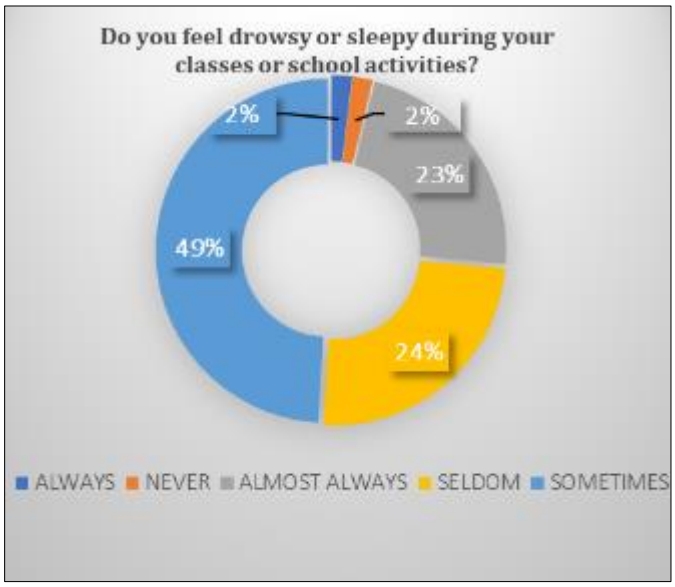
Furthermore, 13.2% indicated "never," reflecting that a portion of students enjoy continuous sleep. However, there is also a vulnerable group: 5.7% responded "almost always" and 1.9% "always," indicating the presence of frequent nighttime awakenings in some cases.

These data reveal that while the majority do not experience this problem recurrently, about a third do experience it at least occasionally, which could be related to stress, anxiety, screen use before bed, or poor sleep hygiene. Sleep disruption can affect the quality of rest, decrease the deep sleep phase, and negatively impact students' academic performance and emotional health. Furthermore, the identification of such a small but significant group of students who experience frequent awakenings underscores the implications of providing an integrated preventive intervention within the school context. These students can be identified earlier, rather than waiting to intervene with educational workshops, assessments, or simple questionnaires that guide them toward healthier sleep.

Preventive intervention can help students prevent occasional awakenings from developing into a more complex and chronic sleep disorder. It is important to consider that even infrequent interruptions can accumulate, creating a "sleep debt" that negatively impacts learning, memory, and emotional regulation. If schools and families normalize these disruptions, they risk minimizing student outcomes. Schools can improve students' sleep and academic performance, as well as their emotional resilience and overall health, by making sleep a priority for both education and public health.

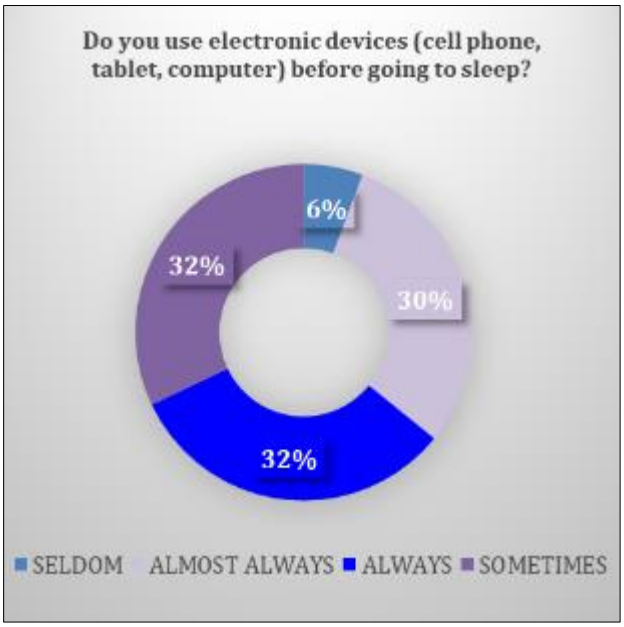
Note: (From left to right) Carlos Zaid Murrieta Reyes, Carlos Julián Morales Antonio, Evelyn Denisse Martínez Sánchez, Melissa Itzel Landero Galindo, Luz De Fátima López Tapia, Carlos Alexis Perdomo Mendoza, and Jonathan Lemini Moyotl.

Figure 3 Medical student team.



Note: 49.1% of respondents indicate that they “sometimes” feel sleepy during classes, while 24.5% report that this occurs “rarely” and 22.6% “almost always.” Only 1.9% report feeling sleepy “always,” and another 1.9% “never.” These results show that almost half of students experience sleepiness occasionally, which can interfere with their attention, participation, and academic performance. This trend suggests a possible direct consequence of irregular or insufficient sleep habits, such as going to bed late or sleeping less than necessary. Likewise, frequent sleepiness (almost always or always) affects approximately a quarter of students, which may be a warning sign of a sleep-wake cycle disorder that should be addressed to improve academic performance and overall student health.

Figure 4 Drowsiness or sleep in classes

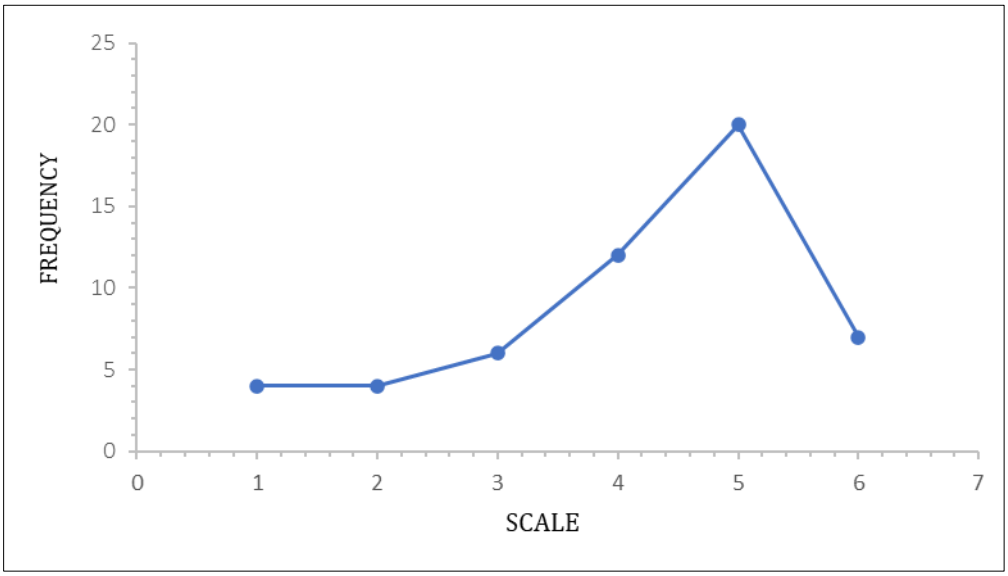


Note: 32.1% of respondents indicated that they "always" use electronic devices before bed, and another 32.1% mentioned that they do so "sometimes." Additionally, 30.2% stated that they use them "almost always," while only 5.7% reported doing so "rarely." These data reflect that using electronic devices before bed is a very common practice among most participants. This habit can have a negative impact on sleep onset and quality of sleep, due to exposure to the blue light emitted by screens, which interferes with the production of melatonin, a key hormone for regulating the sleep cycle. Therefore, it is important to raise awareness about the potential effects of nighttime technology use and promote sleep hygiene strategies that limit its use before bed.

Figure 5 Use of electronic devices

Table 5 Sleep quality frequency table on a scale of 1 to 10

Sleep quality on a scale of 1 to 10	Frequency	Relative frequency	Cumulative absolute frequency	Cumulative relative frequency
4	4	0.08	4	0.08
5	4	0.08	8.00	0.16
6	6	0.11	14.00	0.27
7	12	0.23	26.00	0.50
8	20	0.38	46.00	0.87
9	7	0.13	53.00	1.00
Total	53	1.00		



Note: Most participants rate their sleep quality between 7 and 8 (23% and 38% respectively), with a mean of 7, mode, and median of 8. The standard deviation is 1.4, indicating moderate dispersion. This suggests that, overall, respondents perceive their sleep quality as good, although there is some variability.

Figure 6 Sleep quality on a scale of 1 to 10

5. Discussion

The results obtained in this research reflect a clear trend: high school students, especially in San Andrés Xiutetelco, present unhealthy sleep habits, marked by late bedtimes, excessive use of electronic devices before bed, and an ambiguous perception of their nighttime rest. The finding that more than 90% of students use electronic devices before bed (ranging from "always," "almost always," to "sometimes") is consistent with previous studies that associate screen exposure with the inhibition of melatonin secretion, which delays sleep onset and reduces its quality. This may explain why almost half of those surveyed report feeling sleepy during classes, which directly affects their academic performance.

Although it is true that most students do not respond as having chronic difficulty falling asleep or restraining difficulties getting back to sleep if they wake up during the night, it is important to note that even occasional levels of stress, anxiety, and non-restorative sleep are indicators that need to be addressed. These patterns could evolve into sleep disorders if not addressed promptly with appropriate education and strategies. It is important to note that the general perception of "good sleep quality" (scores of 7 and 8 on a scale of 1 to 10) contrasts with the presence of daytime sleepiness and a

feeling of limited rest. This apparent contradiction suggests a lack of knowledge about what truly constitutes restful sleep, reinforcing the need for educational and community intervention.

In this sense, the data highlight the relevance of integrating sleep education into the school curriculum, not only as a health issue but also as a determinant of academic success. When students do not recognize the signs of inadequate sleep quality and normalize fatigue, they run the risk of developing pervading habits that can negatively impact their physical health and their cognitive ability. Addressing these issues earlier rather than later would allow schools to be preventative on and off the school ground and in conjunction with performance in all other areas of adolescents' lives.

6. Conclusion

This research identified that, while most students perceive their sleep as "good," they exhibit patterns that compromise their rest and, consequently, their academic performance. Excessive use of electronic devices before bedtime, coupled with later bedtimes, is one of the main factors that disrupt sleep quality in this population. It is concluded that it is urgent to promote better sleep hygiene in schools and families through educational programs that raise awareness about the importance of rest, limit screen use before bedtime, and encourage healthy routines. We also believe that the recommendation to institutions that they should consider adjusting school schedules to better fit adolescents' biological rhythms is valid.

Finally, the results of this study serve as a basis for future interventions, the development of school policies, and comparative studies in similar contexts with the goal of improving academic performance and, above all, the overall health of students. This research provides evidence that is relevant locally and even globally, laying the groundwork for future interdisciplinary collaboration between educators, health professionals, and policymakers to ensure our students get better sleep.

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

The authors declare that they have no conflict of interest to disclose.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

[1] Carskadon MA. Sleep in adolescents: The perfect storm. Pediatr Clin North Am. 2011;58(3):637-47. doi:10.1016/j.pcl.2011.03.003

[2] BaHammam AS, Hunasikatti M, editors. Sleep Apnea Frontiers: Pathophysiology, Diagnosis, and Treatment Strategies. Singapore: Springer Nature; 2023. p. 85-101. doi:10.1007/978-981-99-7901-1

[3] Ovbiagele B, Lewis S, Correa DJ, Thomas R, Charleston L IV, editors. Achieving Equity in Neurological Practice: Principles and Pathways. Cham: Springer Nature Switzerland; 2024. doi:10.1007/978-3-031-62727-9

[4] Urrila A, Artiges E, Massicotte J, et al. Sleep habits, academic performance, and adolescent brain structure. Sci Rep. 2017;7:41678. doi:10.1038/srep41678

[5] Scammell TE, Saper CB, Czeisler CA. Sleep disorders. In: Kasper DL, Hauser SL, Jameson JL, Fausi AS, Longo DL, Loscalzo JL, editors. Harrison's Principles of Internal Medicine. New York: McGraw Hill Medical; 2011. p. 184-94.

[6] Sánchez T, Rojas C, Casals M, Bennett JT, Gálvez C, Betancur C, Mesa JT, Brockmann PE. Sleep-disordered breathing in Chilean schoolchildren: prevalence and risk factors. Chilean J Pediatr. 2018;89(6):718-25. doi:10.4067/S0370-41062018005000902

[7] Guclu Y, Guclu OA, Demirci H. Relationships between internet addiction, smartphone addiction, sleep quality, and academic performance among high-school students. Rev Assoc Med Bras. 2024;70:e20230868. doi: 10.1590/1806-9282.20230868

[8] Rathakrishnan B, Bikar Singh SS, Kamaluddin MR, Yahaya A, Mohd Nasir MA, Ibrahim F, Ab Rahman Z. Smartphone addiction and sleep quality on academic performance of university students: an exploratory research. Int J Environ Res Public Health. 2021;18(16):8291. doi:10.3390/ijerph18168291

[9] Navalón-González M, Montenegro-Espinosa JA, Gutiérrez-Espinoza H, Olivares-Arancibia J, Yañéz-Sepúlveda R, Duclos-Bastías D, et al. Associations between social networks, messaging apps, addictive behaviors, and sleep problems in adolescents: the EHDLA study. Front Behav Neurosci. 2025;19:1512535. doi: 10.3389/fnbeh.2025.1512535