

Digital Distractions, Sleep and Student Performance: A Study on Gen Z Learners

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ABSTRACT

Objective: This study aims to identify and classify sleep patterns among Gen Z students, examining the impact of sleep on cognitive functions critical for academic success and overall well-being. **Method:** Utilizing a cross-sectional survey-based approach, the research collected data on sleep duration, quality, timing, and associated lifestyle factors, including digital habits, diet, and academic workload. **Results:** The findings reveal that irregular sleep patterns, excessive screen time, and academic pressures are major contributors to sleep deprivation among Gen Z students. Poor sleep quality is linked to diminished memory, concentration, and problem-solving abilities, as well as heightened stress, mood disturbances, and compromised physical health. **Novelty:** This study provides a comprehensive analysis of the multifactorial influences on sleep behavior among Gen Z students, highlighting the critical connection between digital lifestyles and sleep health. The insights gained advocate for targeted interventions by educators and policymakers to promote healthier sleep practices, underscoring the essential role of sleep in fostering cognitive performance and emotional resilience in the digital era.

INTRODUCTION

A biological necessity for mental clarity, emotional stability, and physical well-being is sleep. Because it has a direct impact on learning, memory retention, attention, and overall academic performance, getting enough sleep is especially crucial for students. However, Gen Z students frequently put their academic, social, and digital activities ahead of their sleep in today's hectic and demanding environment, which results in inconsistent and inadequate sleep habits. These disturbances have a substantial impact on their bodily and mental health in addition to impairing their cognitive capacities.

A number of variables, such as lifestyle choices, environmental circumstances, and psychological pressures, affect how Gen Z students sleep. For example, severe academic workloads, extensive screen times, and erratic study schedules frequently disrupt the circadian rhythm, leading to both insufficient sleep duration and poor sleep quality. Additionally, stress from social and academic demands makes sleep problems worse, which impairs students' capacity to perform well.

Sleep is vital for memory consolidation, mood regulation, and attention, all of which are necessary for Gen Z students to balance their personal and academic obligations, according to research. Conversely, lack of sleep has been connected to poorer academic performance, a shorter attention span, and trouble making decisions. Lack of sleep also has a detrimental impact on emotional well-being, raising the risk of stress,

anxiety, and despair. Students' productivity and enjoyment of life may be further hampered by poor sleep habits, which also lead to physical health problems like decreased immunity and chronic weariness.

Determining interventions that encourage better sleep habits requires an understanding of the connection between Gen Z's sleep patterns, cognitive function, and general well-being. Researchers can offer practical solutions to these problems by classifying sleep habits and analysing how they affect students' academic and personal lives. Additionally, investigating the psychological, environmental, and lifestyle elements affecting Gen Z's sleep might assist identify the underlying causes of sleep disorders and open the door to focused remedies.

The purpose of this study is to close important knowledge gaps about how sleep habits impact the cognitive function and general wellbeing of Gen Z students. The project aims to offer evidence-based suggestions for enhancing students' sleep patterns by exploring the complex relationship between sleep and several facets of their lives. It also seeks to increase understanding of the value of sleep for academic achievement, personal development, and general well-being among Gen Z students, educators, and legislators.

RESEARCH METHOD

Literature review

A 2023 *Sleep Health* study found that social jetlag and irregular sleep patterns negatively impact female students neurocognitive performance, emphasizing the importance of consistent sleep cycles [1]. Similarly, a *Time* article highlighted how early school start times disrupt teenage circadian rhythms, leading to chronic sleep deprivation, which negatively affects well-being, emotional health, and academic performance. Schools that delayed start times reported improvements in test scores, attendance, and sleep duration.

A 2023 *Sleep Medicine* study found that stress lowers sleep quality, which in turn reduces cognitive function [2]. Oxford University researchers are investigating whether enforcing strict bedtimes can improve mental health [3]. A 2023 *BMJ Public Health* study found that higher sleep quality, consistency, and duration correlate with better academic performance among college students [4]. Another study in *Sleep Medicine* linked working memory and academic success to both sleep quality and mental health, emphasizing the need for proper sleep to optimize cognitive outcomes [2].

Research shows that college students often experience irregular sleep patterns, going to bed late and waking early due to academic pressures and increased screen time [5], [6]. Most students get only 6–7 hours of sleep, less than the recommended 7–9 hours for adults. Sleep disruptions, such as frequent awakenings, further degrade sleep quality [7]. Studies also associate irregular sleep schedules with mood disorders and cognitive decline [8].

Sleep plays a crucial role in attention, memory consolidation, and problem-solving. Deep sleep (slow-wave sleep) enhances learning and memory retention [9], while REM sleep is vital for creative thinking and problem-solving [10]. Sleep deprivation

impairs working memory, attention, and information processing speed, resulting in lower academic performance [11], [12]. Many students report lower test scores and grades after experiencing sleep deprivation.

Beyond academics, inadequate sleep contributes to physical and mental health problems. It increases the risk of weight gain, reduced immunity, and illness [13]. Emotional instability, anxiety, and depression are also closely linked to poor sleep [14]. Students with sleep difficulties are more likely to experience anxiety and depressive symptoms [15]. Additionally, poor sleep increases emotional reactivity, making it harder for students to cope with academic and social stress [6].

Screen exposure, particularly blue light, disrupts circadian rhythms and delays sleep onset [16]. Other distractions, including social media, late-night studying, and gaming, further shorten sleep duration. High academic stress also leads to frequent sleep disruptions [17]. Students who struggle with time management or balancing academic and social life are at greater risk of sleep deprivation [18].

Objective

To identify and categorize common sleep patterns among students, including variations in duration, quality, and timing.

To examine the relationship between sleep patterns and cognitive abilities such as memory, attention, and problem-solving.

To investigate the effects of sleep patterns on students' physical, emotional, and mental well-being.

To explore the lifestyle, environmental, and psychological factors influencing students' sleep habits.

To analyze the influence of digital distractions on sleep patterns and academic performance.

Hypothesis

H₀: There is no significant variation in sleep patterns among students.

H₁: There is a significant variation in sleep patterns among students.

H₀: There is no significant relationship between sleep patterns and cognitive abilities among students.

H₂: There is a significant relationship between sleep patterns and cognitive abilities among students.

H₀: Sleep patterns have no significant impact on students' physical, emotional, and mental well-being.

H₃: Sleep patterns significantly impact students' physical, emotional, and mental well-being.

H₀: Lifestyle, environmental, and psychological factors have no significant influence on students' sleep habits.

H₄: Lifestyle, environmental, and psychological factors significantly influence students' sleep habits.

The study will employ a descriptive correlational design with a cross-sectional approach. The target population will include university and college students, and a

stratified random sampling technique will be used to ensure diversity across age, gender, and academic disciplines. A sample size of at least 136 students will be targeted for statistical reliability. Data will be collected through structured surveys and semi-structured interviews. The surveys will include standardized tools such as the Pittsburgh Sleep Quality Index (PSQI) for sleep quality, cognitive assessments like the Stroop Test, and well-being scales such as the WHO-5 Well-Being Index and GAD-7. Interviews will explore lifestyle, environmental, and psychological factors influencing sleep habits. Quantitative data will be analysed using descriptive statistics, correlation analysis, and regression analysis to assess the relationship between sleep patterns and cognitive performance, as well as their impact on well-being. Ethical considerations will include informed consent, confidentiality, and participants' right to withdraw from the study. The study aims to identify common sleep patterns, their impact on cognitive and emotional health, and the factors influencing sleep habits among students.

RESULTS AND DISCUSSION

Results

Table 1. Demographical

	Level	Count	Total	Proportion	p
Age	23–26	73	136	0.54	0.44
	15–18	14	136	0.1	< .001
	19–22	49	136	0.36	0.001
Gender	Female	54	136	0.4	0.02
	Male	82	136	0.6	0.02
Average	10-20	50	136	0.368	0.003
Weekly	20-30	14	136	0.1	< .001
Study	Less than 10	66	136	0.49	0.797
Hours	more than 30	6	136	0.04	< .001

Interpretation

In terms of age, participants aged 23–26 (53.7%) show no significant deviation from the expected 50% proportion, while the 15–18 years group (10.3%) and 19–22 years group (36%) are underrepresented, with both proportions significantly lower than 50%. Gender proportions show a higher representation of males (60.3%) compared to females (39.7%), with both proportions significantly differing from 0.5. Regarding average weekly study hours, a significant proportion of participants study 10–20 hours per week (36.8%), while fewer participants study 20–30 hours (10.3%) or more than 30 hours (4.4%). The proportion of participants studying less than 10 hours (48.5%) does not significantly differ from 0.5, indicating this is a typical pattern.

Table 2. Pittsburgh Sleep Quality Index (PSQI)

	Level	Count	Total	Proportion	p
Pittsburgh Sleep Quality Index (PSQI) for sleep quality (2)	Fairly Bad (2)	42	136	0.309	< .001
	Fairly Good (1)	92	136	0.676	< .001
	Very Bad (3)	2	136	0.015	< .001

Interpretation

The significant deviations in the proportions of responses for the Pittsburgh Sleep Quality Index (PSQI) categories from the expected value of 50% ($p=0.5$). For the "Fairly Bad" category, 30.9% of participants rated their sleep quality as such, which is significantly lower than 50% ($p<0.001$). In contrast, 67.6% of participants rated their sleep quality as "Fairly Good," which is significantly higher than the expected proportion ($p<0.001$). Additionally, only 1.5% of participants reported "Very Bad" sleep quality, a proportion that is far below 50% ($p<0.001$). These findings suggest that the majority of respondents perceive their sleep quality positively, with a substantial number rating it as "Fairly Good," a moderate number as "Fairly Bad," and very few reporting "Very Bad" sleep quality. Hence the hypothesis "There is a significant variation in sleep patterns among students" is proved.

Table 3. Stroop test

	Level Time took	Count	Total	Proportion	P
Colour that matches the word. For eg, "blue" printed in blue.	As expected				
	Much shorter	12	136	0.088	< .001
	Somewhat longer	64	136	0.471	0.549
	Somewhat shorter	8	136	0.059	< .001
Colour that doesn't match the word. For eg, "blue" printed in red.	As expected,				
	Much longer	22	136	0.162	< .001
	Much shorter	2	136	0.015	< .001
	Somewhat longer	52	136	0.382	0.008
	Somewhat shorter	10	136	0.074	< .001
		50	136	0.368	0.003

Name the colour of the ink for each word.	As expected,				
	Much longer	20	136	0.147	< .001
	Much shorter	2	136	0.015	< .001
	Somewhat longer	44	136	0.324	< .001
	Somewhat shorter	10	136	0.074	< .001
		60	136	0.441	0.198

Interpretation

Test results indicate significant deviations from the proportion of 0.5 in most cases. When participants read words with matching ink colours, fewer took the expected amount of time or a somewhat longer time than expected, while those taking a somewhat shorter time differed significantly from the proportion. For non-matching ink colours, significantly fewer participants took the expected time or a somewhat longer time, while a much shorter time and a somewhat shorter time occurred less frequently than expected, although the latter was closer to the proportion. When naming the colour of the ink, most categories such as taking the expected time, a much longer time, or a somewhat longer time occurred significantly less often, while the proportion of those taking a somewhat shorter time did not significantly differ from 0.5. These results highlight the Stroop effect, where congruence between word meaning and ink colour significantly impacts response times, with participants generally deviating from expected response times, particularly under conditions of non-matching ink colours.

Table 4. WHO-5 well-being index and GAD-7

	Level	Count	Total	Proportion		p
WHO-5 Well-Being Index	≤28: depression	34	136	0.25	0.75	< .001
	≤50: poor well-being	102	136			< .001
	Mild	46	136	0.338	0.162	< .001
	Minimal	22	136			< .001
GAD-7 Anxiety Scale	Moderate	50	136			0.003
	Severe	18	136			< .001

Interpretation

Test results for the WHO-5 Well-Being Index and GAD-7 Anxiety Scale reveal significant deviations from the proportion of 0.5, highlighting key trends in mental health within the sample population. For the WHO-5, 75% of participants scored ≤50 ($p < .001$), indicating poor well-being, while 25% scored ≤28 ($p < .001$), suggesting symptoms of depression. These findings suggest a high prevalence of poor mental well-being among the participants. For the GAD-7 Anxiety Scale, 33.8% of participants reported mild

anxiety ($p < .001$), 36.8% moderate anxiety ($p = 0.003$), and 13.2% severe anxiety ($p < .001$), with only 16.2% reporting minimal anxiety ($p < .001$). This distribution indicates that most participants experience some level of anxiety, with moderate anxiety being the most common. The findings underscore the need for mental health interventions, focusing on improving well-being and addressing anxiety symptoms to support this population. Hence the hypothesis Sleep patterns significantly impact students' physical, emotional, and mental well-being is proved.

Table 5. Lifestyle and environmental factors

	Level	Count	Total	Proportion	p
Hours per day do you spend on screens	2-4 hrs	56	136	0.412	0.048
	4-6 hrs	34	136	0.25	< .001
	Less than 2 hrs	22	136	0.162	< .001
	More than 6 hrs	24	136	0.176	< .001
Consistent bedtime routine	No	70	136	0.515	0.797
	Yes	60	136	0.485	0.797
Consume caffeine or energy drinks	Daily	8	136	0.059	< .001
	Frequently	14	136	0.103	< .001
	Never	26	136	0.191	< .001
	Occasionally	32	136	0.235	< .001
	Rarely	56	136	0.412	0.048
Do environmental factors disrupt your sleep	Daily	12	136	0.088	< .001
	Frequently	14	136	0.103	< .001
	Never	14	136	0.103	< .001
	Occasionally	46	136	0.338	< .001
	Rarely	50	136	0.368	0.003
Relaxation techniques before bedtime	No	76	136	0.559	0.198
	Yes	60	136	0.441	0.198

Interpretation

Significant variations in several lifestyle factors, with deviations from 50% proportion in most cases. Screen time habits vary widely, with 41.2% of participants spending 2-4 hours on screens daily. In terms of bedtime routines, there is a balanced distribution, with 51.5% not having a consistent routine and 48.5% having one, showing no significant difference from 50%. When it comes to caffeine and energy drink consumption, significant deviations were found, with most participants consuming caffeine occasionally or rarely. Regarding environmental disruptions to sleep, most participants report experiencing these occasionally or rarely, though a smaller percentage

report frequent or constant disturbance. Finally, the practice of relaxation techniques before bed shows no significant preference, with 55.9% not practicing relaxation techniques and 44.1% practicing them. These findings highlight a diverse range of habits and behaviours, with marked differences in screen time, caffeine consumption, and sleep disturbances, while bedtime routines and relaxation practices exhibit a more balanced pattern. Hence the hypothesis Lifestyle, environmental, and psychological factors significantly influence students' sleep habits is proved.

Table 6. General sleep habits

	Level	Count	Total	Proportion	p
Biggest barrier to achieving healthy sleep patterns	Academic pressure	12	136	0.088	< .001
	Digital distractions	58	136	0.426	0.103
	Health issues	14	136	0.103	< .001
	Other Social	16	136	0.118	< .001
	engagements	36	136	0.265	< .001
Interested in improving sleep for better cognitive and emotional health	No	24	136	0.176	< .001
	Yes	112	136	0.824	< .001

Interpretation

The barriers to healthy sleep and the interest in learning strategies to improve sleep. Digital distractions are identified by 42.6% of participants as the biggest barrier to achieving healthy sleep, though this proportion does not significantly differ from 50%. In terms of interest in learning strategies to improve sleep for better cognitive and emotional health, an overwhelming 82.4% of participants expressed interest, significantly differing from the 50% mark. This suggests a strong desire among participants to explore methods for improving sleep. Overall, the findings highlight that while digital distractions are the most common barrier to healthy sleep, there is a substantial interest in acquiring strategies to enhance sleep for improved mental and emotional well-being. Hence the hypothesis There is a significant relationship between sleep patterns and cognitive abilities among students is proved.

Discussion

The results of this study highlight the critical impact of digital distractions on the sleep patterns and cognitive performance of Gen Z students. Excessive screen time, particularly during nighttime, was identified as a major disruptor of healthy sleep routines, leading to fragmented sleep and reduced sleep quality. The Pittsburgh Sleep Quality Index (PSQI) findings indicated that while many students reported “fairly good”

sleep, a significant proportion still experienced poor sleep quality. The Stroop Test results further underscored the cognitive consequences, showing slower response times under incongruent word-ink conditions, suggesting impaired attention and cognitive flexibility. This supports previous research linking insufficient sleep with diminished cognitive performance, especially in tasks requiring sustained attention and quick information processing. Moreover, mental health assessments revealed high levels of anxiety and poor well-being among participants, highlighting the psychological toll of sleep disturbances. Thus, addressing digital habits is paramount in promoting better sleep and enhancing students' cognitive resilience.

Lifestyle and environmental factors further complicate the sleep behaviors of Gen Z students. Although some students maintained consistent bedtime routines and relaxation practices, variability in habits like caffeine consumption and exposure to environmental sleep disruptions was evident. High caffeine intake, coupled with stress and academic pressures, exacerbates sleep difficulties, leading to a vicious cycle of sleep deprivation and impaired daytime functioning. Environmental noise and disruptions were also found to be common, yet underreported, barriers to optimal sleep. The balanced distribution in bedtime routines indicates that while some students attempt to regulate sleep, external factors often impede these efforts. These findings reflect the multidimensional nature of sleep challenges faced by students, influenced by both personal habits and external environmental conditions. Holistic intervention strategies should thus address lifestyle modifications alongside environmental improvements to foster better sleep hygiene.

Mental health emerges as a critical area of concern, closely intertwined with sleep quality and cognitive outcomes. The WHO-5 and GAD-7 assessments showed that a majority of students experience poor well-being and moderate to severe anxiety levels. Chronic sleep deprivation is known to exacerbate symptoms of depression and anxiety, further undermining students' emotional stability and academic performance. This study reinforces the bidirectional relationship between sleep and mental health, suggesting that improving sleep patterns could serve as a preventive measure against deteriorating psychological health. Furthermore, students' strong interest in learning strategies to improve sleep points to a readiness for behavioral change. Raising awareness and providing targeted mental health support can empower students to adopt healthier sleep and coping mechanisms. Consequently, mental health interventions must be integrated into academic support services to promote holistic student well-being.

The findings also illustrate the strong influence of digital distractions, not just on sleep, but on overall academic engagement and emotional health. With 42.6% of participants citing digital distractions as the primary barrier to healthy sleep, the pervasiveness of technology use demands targeted action. Strategies such as digital detox programs, screen time management workshops, and the promotion of tech-free zones could mitigate these effects. Furthermore, the integration of digital well-being education into academic curricula could equip students with skills to balance their digital and academic lives more effectively. Behavioral interventions should also focus on fostering

mindfulness and self-regulation techniques to curb compulsive device use. Without addressing the omnipresence of digital devices, any efforts to improve sleep and cognitive health may be undermined. Therefore, combating digital distractions is essential for cultivating healthier academic and personal habits among Gen Z learners.

While the study provides valuable insights, it is not without limitations. The reliance on self-reported data introduces potential biases, as participants may underreport or overestimate their sleep quality and lifestyle habits. Moreover, the sample's demographic homogeneity—dominated by males aged 22 to 23—limits the generalizability of the findings across more diverse student populations. Future research should adopt longitudinal and mixed-method designs to capture more nuanced changes over time and include objective measures such as actigraphy or polysomnography. Additionally, exploring the impact of intervention programs on improving sleep quality and mental health would offer practical recommendations for policymakers and educational institutions. Expanding the sample to include different academic disciplines, age groups, and socio-economic backgrounds will enhance the robustness of future studies. Despite these limitations, the current research lays a critical foundation for understanding the interconnectedness of digital behavior, sleep, and student performance. It paves the way for comprehensive strategies aimed at promoting well-being and academic success among digital-native generations.

CONCLUSION

Fundamental Finding : This study reveals that Gen Z students exhibit moderate to poor sleep quality, significant cognitive variability under stress conditions, and concerning mental health trends, with digital distractions emerging as a key barrier to healthy sleep. Moderate study habits, environmental sleep disruptions, and high screen time usage further compound these challenges, emphasizing the complex interplay between lifestyle factors and well-being. **Implication :** The findings underscore the urgent need for interventions targeting sleep hygiene, mental health support, and digital behavior management to enhance cognitive performance and emotional resilience among students. Promoting structured bedtime routines and providing education on reducing digital distractions may significantly improve students' academic outcomes and overall quality of life. **Limitation :** However, the study's reliance on self-reported measures and a relatively homogenous sample, predominantly 22–23 years old and male, may limit the generalizability of the findings. **Future Research :** Future studies should employ longitudinal designs with more diverse populations and incorporate objective sleep and cognitive performance metrics to validate and expand on these findings, particularly exploring interventions that directly address the digital habits and mental health challenges of today's students.

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