

Sleep Patterns Among College Students: A Cross-Sectional Study Using Pittsburgh Sleep Quality Index and Epworth Daytime Sleepiness Scale

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ABSTRACT

Background: Good quality sleep and an adequate amount of sleep are important in order to have better cognitive performance and to avoid health problems and psychiatric disorders.

Aims and objectives: To assess sleep patterns among college students and evaluate their sleep habits.

Material and Methods: A cross-sectional, questionnaire-based descriptive study was conducted in May 2016 among 200 college students from medical, commerce, and engineering disciplines. Students were recruited randomly by selecting every row in the classrooms. Data collection included demographics, addiction status, Pittsburgh Sleep Quality Index (PSQI) scores, and Epworth Daytime Sleepiness Scale (EDSS) measurements.

Results: The study population comprised 56% female and 44% male students. Academic distribution showed 42% from Engineering, 39% from Medical, and 19% from Commerce students. Most participants (84%) lived in hostels. Sleep timing analysis revealed 62.5% of students slept between 11 PM-1 AM, while 31% slept between 9-11 PM. Electronic device usage before sleep was prevalent (95.5%), with a significant association to delayed sleep timing ($p < 0.05$). Sleep duration analysis showed that 60.5% obtained 5-7 hours of sleep, while 37% achieved 7-9 hours. PSQI analysis indicated 94% of subjects had poor sleep quality (scores >5). EDSS evaluation revealed 66% experienced normal daytime sleepiness, while 30% showed moderate sleepiness requiring attention.

Conclusion: The majority of college students demonstrated poor sleep quality with prevalent electronic device usage before bedtime. Short sleep duration and delayed sleep timing were common, with significant daytime sleepiness affecting academic performance. These findings suggest that there is a need for sleep hygiene education and intervention programs in academic institutions.

Keywords: Pittsburgh Sleep Quality Index (PSQI), Epworth Daytime Sleepiness Scale (EDSS), Poor sleep quality. Sleep latency, Sleep duration, medical students. Engineering students, Commerce students, and electronic device usage.

INTRODUCTION

Sleep is a fundamental biological process essential for cognitive function, emotional regulation, and overall well-being. Among college students, adequate sleep quality and

duration are crucial for optimal academic performance and psychological health (1, 2). However, the transition to higher education often disrupts established sleep patterns due to increased academic demands, social

pressures, and lifestyle changes (9, 25). The prevalence of sleep disorders among college students has become a growing concern, with studies indicating that poor sleep quality significantly impacts academic achievement and daily functioning (5, 7, 8). Modern college life is characterized by irregular schedules, late-night studying, social activities, and widespread use of electronic devices, all of which contribute to disrupted circadian rhythms and compromised sleep quality (4, 9, 17). Electronic device usage before bedtime has emerged as a particularly significant factor affecting sleep onset and quality. The blue light emitted by screens can suppress melatonin production, leading to delayed sleep initiation and reduced sleep efficiency (10, 11, 19, 20). This technological interference with natural sleep processes has become increasingly relevant as smartphone and computer usage continues to rise among young adults (12). Medical students face unique challenges regarding sleep patterns due to intensive academic curricula, clinical rotations, and high-stress environments (6, 22). The demanding nature of medical education often leads to chronic sleep deprivation, which can impair clinical decision-making, increase medical errors, and affect patient safety (23). Similar pressures exist across other disciplines, with engineering and commerce students also experiencing academic stress that impacts sleep quality. The Pittsburgh Sleep Quality Index (PSQI) and Epworth Daytime Sleepiness Scale (EDSS) are widely validated instruments for assessing sleep quality and daytime sleepiness, respectively (13, 14, 15, 16). These tools provide standardized measures for evaluating sleep disturbances and their impact on daily functioning, making them valuable for research in academic populations. Understanding sleep patterns among college students is essential for developing targeted interventions and support systems. Poor sleep quality has been linked to decreased academic performance, increased anxiety

and depression, and impaired cognitive function (8, 17, 25). The relationship between sleep disturbance and academic achievement suggests that addressing sleep issues could significantly improve educational outcomes and student well-being.

This study aims to comprehensively assess sleep patterns among college students from diverse academic backgrounds, examining the relationship between lifestyle factors, electronic device usage, and sleep quality parameters to provide evidence-based insights for improving student health and academic performance.

Aims and objectives: To assess sleep patterns among college students and evaluate their sleep habits.

MATERIAL AND METHODS

Study Design and Setting

This cross-sectional, questionnaire-based descriptive study was conducted during May 2016 among college students from various academic disciplines. The study protocol was designed to assess sleep patterns and their associations with demographic factors and lifestyle habits.

Sampling method: The study employed a convenience sampling method.

Sample size calculation: According to convenient sampling technique a sample size of attain insufficient sleep 70% (25) with allowable error 7% sample size was 200 taken.

Participants: The study population consisted of 200 students (>18 years) from three academic disciplines: medical, commerce, and engineering. Students were recruited randomly by selecting participants in every row within classroom settings to ensure a representative sampling across different academic programs.

Data Collection: Data collection was carried out over a one-week period using structured questionnaires. Confidentiality was assured to all participants prior to data collection. The recruitment and data collection process involved systematic selection of students

from each academic discipline to maintain balanced representation.

Measurements: Information collected included demographic data, academic discipline, living arrangements (hostel vs. nuclear family), and lifestyle factors, including addiction status. Sleep-related data were gathered using two validated instruments:

Pittsburgh Sleep Quality Index (PSQI): This self-report instrument assesses sleep quality across different components: sleep quality, sleep latency, sleep duration, and sleep disturbances. Questions are framed to evaluate these domains comprehensively, with higher scores indicating poorer sleep quality.

Epworth Daytime Sleepiness Scale (EDSS): This scale measures daytime

sleepiness using a short questionnaire format. It evaluates the probability of falling asleep in eight different situations on a scale of increasing probability from 0 to 3. Scores are summed to obtain a single number, with ranges of 0-9 considered normal, 10-11 borderline, and 12-24 indicating that expert advice should be sought.

STATISTICAL ANALYSIS

Descriptive statistics: Frequency and percentage, Inferential statistics: Chi-square test was used. To assess statistical significance with $p < 0.05$ is considered statistically significant.

RESULTS

Table No.1: Socio-demographic profile of college students (n=200)

Gender	frequency	Percentage
Male	88	44
Female	112	56
Faculty		
Commerce	38	19
Engineering	84	42
Medical	78	39
Place of living		
Hostel	168	84
Nuclear family	32	16
Use of electronic devices		
Yes	191	95.5
No	9	4.5
Physical exercise		
Aerobics	13	6.5
Badminton	2	1
Gym	2	1
Sports	1	0.5
Yoga	10	5
Walking	16	8
No	156	78
Stress		
Examination	4	2
Family	1	0.5
Personal	20	10
Study	6	3
No	169	84.5
Use of Caffeine, alcohol other drugs		
Yes	47	23.5
No	153	76.5

The demographic analysis of our study population revealed that 56% of the students were female and 44% were male. The

academic distribution showed engineering students comprising the largest group (42%), followed by medical students (39%) and

commerce students (19%). Living arrangements showed that the vast majority of students (84%) resided in hostels, while only 16% lived in nuclear family settings. Electronic device usage before bedtime was remarkably prevalent, with 95.5% of students reporting regular use of electronic devices before sleep. This near-universal adoption of pre-sleep screen time represents a significant lifestyle factor that may contribute to sleep disturbances and delayed sleep onset across the student population. Physical exercise participation was notably low, with 78% of students reporting no regular physical activity. Among those who did exercise, walking (8%) and aerobics

(6.5%) were the most common activities. The sedentary lifestyle pattern observed may contribute to poor sleep quality and reduced physical fitness among college students. Stress levels varied across the population, with 84.5% of students reporting no significant stress, while 10% experienced personal stress. Academic-related stress from examinations (2%) and study pressure (3%) were relatively low, possibly due to the timing of data collection or under-reporting of academic stress among participants. Substance use patterns showed that 23.5% of students reported using caffeine, alcohol or other drugs, while 76.5% abstained from these substances.

Table 2. Distribution of sleep patterns of students (n=200)

Sleep patterns	frequency	Percentage
Sleep quality		
1(Vary good)	83	41.5
2(Fairly good)	95	47.5
3(Fairly bad)	21	10.5
4(Vary bad)	1	0.5
Latent time of sleep (Minutes)		
0-5	59	29.5
5-15	69	34.5
16-30	55	27.5
31-60	17	8.5
Usual time of wakeup		
1 (Before 6.00.am)	59	29.5
2 (6.00am to 7.00am)	69	34.5
3 (7.00.am to 8.00am)	55	27.5
4 (after 8.00am)	17	8.5
Time of sleep		
9.pm to11pm	66	33
11pm to1 am	89	44.5
1am to 3am	45	22.5
Duration of sleep (Hours)		
3-5	5	2.5
5-7	121	60.5
7-12	74	37.0
Day time sleep (Epworth sleepiness scale)		
Normal range	132	66
Mild sleepiness	60	30
Moderate sleepiness	8	4
Severe sleepiness	0	0
Sleep quality index		
Normal range (1-5)	189	94
Poor sleep quality (6-18)	11	6

Sleep timing analysis revealed concerning patterns, with 44.5% of students going to bed between 11 PM and 1 AM, and 22.5%

sleeping even later (1 AM to 3 AM) and 34.5% of students wake up between (6.00 AM to 7.00 AM). Only 33% maintained the recommended earlier bedtime

of 9 PM to 11 PM. Sleep duration findings showed that the majority of students (60.5%) obtained only 5-7 hours of sleep per night, which falls below the recommended 7-9 hours for young adults. While 37% achieved adequate sleep duration (7-12 hours), a concerning 2.5% obtained severely insufficient sleep (3-5 hours per night). The Pittsburgh Sleep Quality Index results were particularly alarming, with 94% of students demonstrating poor sleep quality (PSQI scores >5). This finding indicates widespread

sleep disturbances across the student population, regardless of academic discipline or demographic factors. Daytime sleepiness assessment using the Epworth Daytime Sleepiness Scale showed that while 66% of students fell within the normal range, 30% experienced mild sleepiness requiring attention, and 4% showed moderate sleepiness. No students demonstrated severe sleepiness levels, suggesting that while sleep quality is poor, most students maintain functional daytime alertness.

Table 3: Use of electronic devices with different sleep patterns

Latent period (Minutes)	Yes	No	Chi-square test
0-5	52(28.4)	3(17.6)	$\chi^2=11.85$
5-15	63(34.4)	2(11.8)	P<0.05 significant
16-30	54(29.5)	9(53.0)	
31-60	14(7.6)	3(17.6)	
Hours of sleep			
3-5	4(2.1)	2(18.2)	$\chi^2=11.98$
5-7	117(61.9)	3(27.3)	P<0.05 significant
7-12	68(36.0)	6(54.5)	
Time of sleep			
9.pm to 11pm	59(30.9)	7(77.8)	$\chi^2=8.63$
11pm to 1 am	88(46.1)	1(11.1)	P<0.05 significant
1am to 3am	44(23.0)	1(11.1)	

The relationship between electronic device usage and sleep parameters revealed that students using electronic devices before bed showed earlier sleep onset (28.4% slept within 0-5 minutes) compared to non-users. It is statistically significant ($\chi^2=11.85$, $p<0.05$), students using electronic devices and hours of sleep are statistically significant

($\chi^2=11.98$, $p<0.05$). Students using electronic devices sleep 5-7 hours was 61.9% compared to non-users, 7-12 hours (27.3%). However, device users were more likely to sleep later (46.1% between 11 PM-1 AM) compared to non-users (77.8%) sleeping between 9-11 PM. It is statistically significant ($\chi^2=8.63$, $p<0.05$)

Table 4. Comparison of feeling fresh after waking up compared with stress and the time of sleep

Stress	Yes	No	Chi-square test
Examination	3(2.3)	1(1.5)	$\chi^2=11.85$ P<0.05 significant
Family	1(0.8)	0	
Personal	5(3.8)	15(22.4)	
Study	2(1.5)	4(6.0)	
No	122(91.7)	47(70.1)	
Time of sleep			
9.pm to 11pm	51(38.3)	15(22.4)	$\chi^2=10.24$
11pm to 1 am	62(46.6)	27(40.3)	P<0.05 significant
1am to 3am	20(15.1)	25(37.3)	

The association between stress level and fresh after waking up is statistically significant ($\chi^2=11.85$, $P<0.05$), 91.7% of the students having stress wake up fresh as compared to non-stress students fresh after wake up (70.1%). The association between

time of sleep and feeling fresh after waking up is statistically significant ($\chi^2=10.24$, $P<0.05$). There are 46.6 % students feel fresh after wake up compared to feel no fresh after wake up (40.3%) sleep between 11 am – 1 am.

Table 5: Comparison of sleep quality with faculty and exercise

Sleep quality Vs faculty	Frequency	Engineering	Commerce	Medical	Chi- square test
1	83	16(19.3)	12(14.5)	35(42.2)	$\chi^2=5.89$
2	95	39(41.1)	17(17.9)	39(41.1)	$P>0.05$
3	21	9(42.9)	9(42.9)	9(42.9)	Not significant
4	1	0	0	0	
Sleep quality Vs Exercise		Yes	No		
1	83	22(50.0)	61(39.1)		$\chi^2=2.89$
2	95	20(45.5)	75(48.1)		$P>0.05$
3	21	1(2.3)	20(12.8)		Not significant
4	1	1(2.3)	0		

Sleep quality comparisons across academic disciplines showed that medical students had slightly better subjective sleep quality ratings (42.2% rated quality as 1) compared to engineering (19.3%) and commerce students (14.5%). Which is not significant. Students who engaged in regular physical exercise showed better sleep quality patterns, with 50% of exercising students achieving the best sleep quality category compared to 39.1% of non-exercising students. This finding supports the established relationship between physical activity and sleep quality. But it is statistically not significant.

DISCUSSION

The findings of this study reveal concerning patterns of sleep disturbance among college students, with implications for academic performance, health outcomes, and overall well-being. The near-universal prevalence of poor sleep quality (94% with PSQI scores >5) indicates a systemic issue that transcends individual academic disciplines and demographic characteristics.

The widespread use of electronic devices before bedtime (95.5%) aligns with growing concerns about technology's impact on sleep health. The blue light emission from electronic screens can suppress melatonin production and delay circadian rhythm phase, leading to difficulty falling asleep and reduced sleep quality (10, 11, 19). Our finding that device users tend to sleep later (46.1% between 11 PM-1 AM) supports this mechanism, even though the immediate sleep latency may appear shorter in some cases.

The predominant sleep duration of 5-7 hours among 60.5% of students falls significantly

below the 7-9hours recommended for young adults by sleep medicine organizations (3, 18). This chronic sleep restriction can lead to cumulative sleep debt, impaired cognitive function, and increased risk of academic difficulties (7, 8). The fact that only 37% of students achieve adequate sleep duration suggests widespread sleep deprivation that may compromise learning capacity and academic performance.

The delayed sleep timing patterns observed, with 67% of students sleeping after 11 PM, reflect the common "night owl" tendency among young adults and the social jetlag phenomenon prevalent in college environments (4). Late bedtimes combined with early class schedules create a mismatch between biological circadian preferences and academic demands, potentially leading to chronic sleep deprivation and daytime sleepiness.

The low prevalence of regular physical exercise (22%) among students represents a missed opportunity for sleep quality improvement. Research consistently demonstrates that regular physical activity enhances sleep quality, reduces sleep latency, and increases deep sleep duration (24). Our finding that exercising students showed better sleep quality patterns (50% vs 39.1% achieving optimal quality) supports implementing physical activity programs as part of comprehensive sleep hygiene interventions.

The relationship between electronic device usage and sleep parameters revealed statistically significant associations with sleep latency ($\chi^2=11.85$, $p<0.05$), sleep duration ($\chi^2=11.98$, $p<0.05$), and sleep timing ($\chi^2=8.63$, $p<0.05$). These findings

provide quantitative evidence for the detrimental effects of pre-sleep screen exposure on various sleep parameters, supporting recommendations for digital curfews and sleep hygiene education (12, 20).

The association between stress levels and feeling refreshed upon waking ($\chi^2=11.85$, $p<0.05$) highlights the complex interplay between psychological factors and sleep quality. Interestingly, 91.7% of students with stress reported feeling fresh upon waking compared to 70.1% of non-stressed students, suggesting that stress may not always correlate directly with perceived sleep quality or that students may have adapted coping mechanisms (17, 21).

Sleep quality comparisons across academic disciplines showed that medical students had slightly better subjective sleep quality ratings (42.2% rated quality as 1) compared to engineering (19.3%) and commerce students (14.5%), though this difference was not statistically significant ($\chi^2=5.89$, $p>0.05$). This finding contradicts some literature suggesting medical students experience worse sleep quality due to academic pressures (6, 22), possibly indicating effective stress management strategies or adaptation to demanding schedules.

The daytime sleepiness assessment revealed that while 66% of students fell within the normal range on the Epworth scale, 30% experienced mild sleepiness requiring attention, and 4% showed moderate sleepiness. This distribution suggests that despite poor sleep quality, most students maintain functional daytime alertness, possibly through compensatory mechanisms such as caffeine use (23.5% substance use) or adaptation to chronic sleep restriction (9, 25). The implications of these findings extend beyond individual health consequences to institutional and societal levels. Poor sleep quality among students can lead to decreased academic achievement, increased healthcare utilization, and reduced quality of life (5, 7, 23). Educational institutions may experience higher dropout rates, lower graduation rates,

and reduced academic excellence when students experience chronic sleep problems. The study's limitations include its cross-sectional design, which prevents causal inferences, and the convenience sampling method, which may limit generalizability. Additionally, self-reported measures may be subject to recall bias and social desirability effects. Future research should employ longitudinal designs and objective sleep measures to better understand the temporal relationships between lifestyle factors and sleep outcomes.

The findings suggest several intervention opportunities, including sleep hygiene education programs, digital wellness initiatives, physical activity promotion, and institutional policy changes regarding class scheduling and academic workload management. Comprehensive approaches addressing both individual behaviors and environmental factors are necessary to effectively improve sleep health among college students (21, 24).

CONCLUSION

This study demonstrates that poor sleep quality is a pervasive issue among college students, associated with multiple lifestyle and environmental factors. The high prevalence of electronic device usage before bedtime, insufficient sleep duration, and delayed sleep timing patterns requires urgent attention from educational institutions, healthcare providers, and policymakers. Comprehensive interventions addressing both individual behaviors and institutional factors are necessary to improve sleep health and consequently, academic success and overall well-being among college students.

Declaration by Authors

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