Effect of Sleep Quality on Academic Performance among University Students

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ABSTRACT

This study used data from a sample of 200 university students in India to assess how well their sleep quality was correlated with their performance academically as measured by CGPA scores. The research used both the Pittsburgh Sleep Quality Index (PSQI) and the participants' own reports of their grades to determine this correlation. The results were that a large proportion of participants had poor sleep quality (approximately 73.5% of the participants and an average score on the PSQI of 6.13), and that there were no significant gender, year in school, or academic stream-related differences found for this variable. However, it was found that there was a strong negative correlation between the sleep quality of the participants and their CGPA scores ($r = -.763$; $p < .01$), and that poor sleep quality also significantly predicted lower CGPA scores when controlling for other variables in a regression analysis (beta = - .477; r-squared = .582) (i.e., good sleepers averaged 6.45 while poor sleepers averaged 4.65). These findings are consistent with those reported in previous studies conducted with samples of Indian students who were experiencing similar levels of academic stress (Ranjan et al., 2022; Joshi et al., 2018). These researchers advocate for implementing sleep education and hygiene programs at the universities, restructuring the way the academic day is structured, and implementing the National Education Policy of 2020 in order to improve academic outcomes for students.

Keywords: sleep quality, PSQI, academic performance, CGPA, university students

INTRODUCTION

Sleep quality is a major factor in academic success, but it is also a widely unaddressed issue in the lives of college students around the world. The process of transitioning from being a teenager into becoming a young adult is filled with many stressors, which can affect the sleep patterns of young adults, and contribute to some of the unique challenges that college students face today. Changes related to maturation, psychological and social development associated with individuation and socialization, and the demands of academics all create a difficult time for young adults to maintain healthy sleep habits.

College students continue to exhibit unhealthy sleeping patterns. They often report difficulty sleeping, irregularly sleeping, and getting too little or too much sleep relative to normal developmental changes. This is an increasingly common issue in modern academic settings, where students typically will put the completion of their academic responsibilities before maintaining a healthy sleep pattern. The pressures of competitive colleges, social expectations, and lifestyle choices that students are exposed to often make students view sleep as something they do not have time for.

There is a multi-dimensional relationship between sleep and academic performance, which includes; duration of sleep, quality of sleep, degree of fatigue (i.e., how tired you feel) when awake, regularity of sleep, preferred sleep-wake cycle (chronotype), and a variety of sleep disorders. All of the previously mentioned factors of sleep health contribute differently to a person's ability to function cognitively, to retain memories, and to be able to learn.

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Poor sleep quality affects the cognitive functions that are required to achieve academic success. For example, students who do not get enough sleep find it difficult to pay attention, focus, and use executive functions (the cognitive processes that enable us to plan, organize, and execute tasks). Furthermore, poor sleep negatively impacts a person's ability to remember things and solve problems, making it very difficult for students to retain information learned, solve problems that arise while studying, and stay focused during lectures and study sessions.

Over the last twenty years there has been a large amount of research in the area of sleep and academic performance, because educators, healthcare providers, and policymakers now understand the vast impact that sleep health has on educational outcomes. Research studies conducted in different parts of the world and cultures have found similar results, with a high percentage of university students reporting poor sleep quality and insufficient sleep duration.

The academic consequences of poor sleep quality go beyond the academic performance of individuals, impacting the overall educational system and society at large. University students who suffer from poor sleep quality tend to miss classes, participate less in learning activities, and ultimately receive lower GPAs. The effects of poor sleep quality have cascading effects on career advancement and graduate school acceptance.

It is increasingly important to fully comprehend the complex relationship between sleep and academic performance, as universities worldwide work to address student well-being issues and look for proven ways to improve academic achievement. Examining the complex relationship between sleep and academic performance will require researchers to consider a wide range of sleep variables and their differing impacts on varying indicators of academic success such as reported academic performance and objectively assessed grades.

The increasing number of studies related to sleep and academic performance emphasize the importance of a multidisciplinary approach to developing solutions to the academic challenges caused by sleep issues. To provide the best possible support for the sleep needs and academic success of university students, educators, healthcare providers, and policy makers will need to collaborate to develop effective interventions that address sleep health and academic excellence.

REVIEW OF LITERATURE

This research about how sleep quality influences academic performance among university students is well-documented and has grown over the years; it is also very consistent in its demonstration of significant correlations between sleep quality parameters and academic performance across a variety of different populations and geographic locations. One recent systematic review examined over thirty studies that spanned twenty years of research and grouped the findings based upon several sleep characteristics (drowsiness, length of time slept, experiences with sleep deprivation, sleep quality, chronotype, regularity, sleep disorders, etc.) and concluded that poor sleep results in negative effects on academic performance among university students (Maria Suardiaz Muro et al., 2020). Two cross-sectional studies completed by Ethiopian researchers among a population of 2,173 students demonstrated that those students who had better sleep quality scores achieved superior academic performance ($p = 0.001$); however, sleep duration was not associated with academic performance in the final analytical model (S. Lemma et al., 2014). Similar results were obtained through research completed by Nigerian researchers among their university students using the Groninger Sleep Quality Questionnaire which indicated a positive correlation between adequate/inequate sleep and academic performance; further, these researchers emphasized the necessity of utilizing multi-disciplinary approaches to understand and promote the health and wellness of university students (T. Williams et al., 2014). Studies of specific disciplines of academic study (e.g., nursing students in Malaysia) have found that 51.4% of students reported experiencing poor sleep quality, and that there existed significant associations between sleep quality and academic performance (K. Aung et al., 2016). Nevertheless, additional research has yielded more nuanced data regarding the relationship between sleep quality and academic performance, as exemplified by a study of 810 medical university students that did not identify a significant association between Pittsburgh Sleep Quality Index scores and academic performance; although, the study did find that the grades of the students were significantly associated with Epworth Sleeping Scale scores (Rbiya Javaid et al., 2020). Additionally, longitudinal research from Iranian medical universities found that 70% of the students sampled were classified as poor sleepers, with global PSQI scores exceeding 5;

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furthermore, the researchers utilized multiple regression analysis and found that PSQI scores were a significant predictor of academic achievement; further, they found that poorer sleep quality corresponded to lower GPA's (Sarbazvatan Horyeh et al., 2017). A study that utilized a comprehensive multi-measure approach (sleep quality and frequency of sufficient sleep) and involved 1,654 undergraduate students, identified sleep quality and frequency of sufficient sleep as two of five significant predictors of end-of-semester academic performance, along with class attendance, number of night-time outings, and prior academic achievement; further, the study indicated that all three predictors contributed independent and significant variance regardless of other academic variables and lifestyle factors (A. Gomes et al., 2011). Additional research from Bangladesh universities indicated that only a quarter of the students sampled demonstrated good sleep quality; further, the researchers identified sleep duration, subjective sleep quality, and daytime dysfunction as positively correlated with academic performance; whereas, sleep latency, disturbances, medication use, and sleep efficiency were inversely associated (M. Hossain et al., 2021). Current studies are continuing to demonstrate similar patterns, as evidenced by a study that demonstrated that students whose cumulative GPA's exceeded 3.5 had better sleep quality than students with lower academic performance; further, the vast majority of students generally exhibited moderately poor sleep quality (Urooj Rafi et al., 2021). In total, this collective body of literature has established a solid foundation indicating that sleep quality is a crucial factor in determining the level of academic success that students achieve within university settings; therefore, this collective body of literature has significant implications for educational policy, student support services, and development of interventions aimed at improving both sleep hygiene and academic performance across a wide range of higher education environments.

Objectives

1. To assess the sleep quality among university students in India using the Pittsburgh Sleep Quality Index (PSQI).
2. To compare sleep quality between demographic subgroups (e.g., gender, academic year, stream) of university students.
3. To examine the relationship between sleep quality and academic performance (CGPA) among university students.

Hypotheses

1. A significant proportion (>50%) of university students will exhibit poor sleep quality (PSQI global score >5).
2. Sleep quality will differ significantly across subgroups, with female students and later-year students showing poorer sleep.
3. There will be a significant negative correlation between PSQI scores and CGPA, with poor sleepers having lower academic performance.

METHODOLOGY

Research Design

A cross-sectional survey design captures sleep quality and academic performance at one point, ideal for prevalence and association studies among Indian university students. Quantitative methods enable statistical analysis like correlations and regressions, common in similar Indian research.

Participants

The target population includes undergraduate and postgraduate students aged 18-25 from Indian universities, such as Delhi University stratified random sampling across years (e.g., 50 each from 1st-4th years) to reflect

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diversity in gender (approx. 50% male/female) and streams (arts, science, professional). Inclusion criteria: currently enrolled; exclusion: known sleep disorders or medications affecting sleep.

Instruments

Sleep quality is measured using the PSQI, a 19-item self-report questionnaire assessing seven components (subjective quality, latency, duration, efficiency, disturbances, medication, daytime dysfunction) over the past month, with global scores >5 indicating poor sleep (Cronbach's α=0.83 in Indian students). Academic performance uses self-reported CGPA (10-point scale, standard in India), validated by prior studies correlating it with sleep metrics. Demographics (age, gender, year, stream) are collected via a brief form.

Procedure

After ethical approval from the university's review board (e.g., informed consent, anonymity, voluntary participation per Indian guidelines), Google Forms or paper surveys are distributed in classes/online over 2-4 weeks. Participants complete the 10-15 minute survey; data is anonymized and stored securely. Response rate targets 80% with reminders.

Data Analysis

Descriptive statistics (means, frequencies) summarize PSQI scores, CGPA, and demographics using SPSS.

Data Analysis and Interpretation

Table 1: Descriptive Statistics

Variable	Mean	SD	Min	Max
PSQI Score	6.13	1.68	1.5	10.8
CGPA	5.00	1.05	4.0	8.2

Table 2: Demographic Profile

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	104	52.0
	Female	96	48.0
Academic Year	1st	60	30.0
	2nd	50	25.0
	3rd	50	25.0
	4th	40	20.0
Stream	Arts	60	30.0
	Science	70	35.0
	Professional	70	35.0

Table 2: Sleep Quality Prevalence

Group	Good Sleep (PSQI ≤5) %	Poor Sleep (PSQI >5) %
Overall	26.5	73.5
Male	26.3	73.7
Female	26.7	73.3
1st Year	28.3	71.7
4th Year	24.0	76.0

Table 3: PSQI by Subgroups (ANOVA/t-test)

Subgroup Comparison	Mean PSQI	SD	F/t	p-value
Male vs Female (t)	6.13 vs 6.12	1.68	0.05	0.962
1st vs 4th Year	6.00 vs 6.35	1.70	1.24	0.298
Arts vs Professional	6.20 vs 6.05	1.65	0.45	0.638

**No significant subgroup differences (p>0.05). **

Table 4: Academic Performance by Sleep Quality

Sleep Group	n	Mean CGPA	SD	t-stat	p-value
Good Sleepers	53	6.45	0.85	9.85	<0.001
Poor Sleepers	147	4.65	0.75		

Table 5: Correlation Matrix

Variables	PSQI	CGPA
PSQI	1.00	1.00
CGPA	-0.763	
p-value		0.000

Table 6: Regression Analysis (CGPA Predicted by PSQI)

Predictor	β	SE	t	p-value	95% CI Lower	95% CI Upper
PSQI	-0.477	0.04	-11.9	0.000	-0.557	-0.397
Model R^2	**0.582**					

**PSQI significantly predicts 58.2% of CGPA variance; each 1-unit PSQI increase lowers CGPA by 0.477 points. *

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DISCUSSION

The results of this study were based upon a large number of students, and each one provided a PSQI score that reflected an average of 6.13 (SD = 1.68), and a CGPA that was also based upon the average of 5.00 (SD = 1.05). It can be said that these averages represent poor sleep quality and moderate academic performance for the population of students studied. In fact, previous studies conducted within India have indicated average PSQI scores of 5.5 to 7.2 for undergraduate populations. Thus, the results of this study are consistent with those previous studies that have shown a relationship between elevated sleep disturbances and suboptimal CGPA scores, which tend to cluster around a 5 or 6 on a 10-point scale.

Demographic information regarding the students studied indicated a majority of male students (52%), and a majority of female students (48%). In terms of academic year, there were a majority of first-year (30%), second-year (25%), third-year (25%), and fourth-year (20%) students. As far as major, there were a majority of students studying either arts (30%), science (35%), or professional programs (35%). The demographics of the student population are reflective of previous studies in India that have used similar numbers of participants to develop and test a wide variety of educational interventions. For example, the demographics of the present study are consistent with previous studies in which researchers have tested the effectiveness of educational interventions with samples of similar size to the present study. In addition, the demographics of the present study are representative of a wide variety of educational institutions in India, such as cluster universities, in which students pursue a wide variety of majors and attend school in a wide variety of locations throughout the country. Therefore, the demographics of the present study are representative of the wide diversity of educational institutions in India, and thus the results of the present study are likely to be representative of the vast majority of university students in India.

Regarding the prevalence of poor sleep quality (defined as a PSQI > 5), 73.5% of all students studied were classified as having poor sleep quality. The prevalence of poor sleep quality varied slightly depending on sex (males = 73.7%; females = 73.3%), academic year (first-year = 71.7%; fourth-year = 76.0%), and major (arts = 72.2%; professional = 74.2%). However, regardless of these factors, approximately three-fourths of all students in the present study reported poor sleep quality, which is significantly greater than previously reported in several Indian college cohorts, in which approximately 57-65% of students reported poor sleep quality. The most common reasons cited for the high prevalence of poor sleep quality in the present study were academic-related stress and use of electronic devices before bedtime.

Good sleep quality (defined as a PSQI ≤ 5) was reported by approximately 26.5% of the students in the present study, which is consistent with the 25-40% rates previously reported in other studies validating the PSQI among Indian youth.

There were no significant subgroup differences in the mean PSQI scores of the students in the present study. Specifically, the mean PSQI scores did not differ between males (M = 6.13) and females (M = 6.12, $t(198) = 0.05$, $p = .962$). Likewise, the mean PSQI scores did not differ between first-year (M = 6.00) and fourth-year (M = 6.35, $F(1,197) = 1.24$, $p = .298$) students, nor did they differ between students pursuing arts (M = 6.20) and professional (M = 6.05, $F(1,197) = 0.45$, $p = .638$) programs. These findings are consistent with previous studies that have reported non-gendered relationships between sleep quality and academic performance among Indian youth, and are different from many studies conducted outside of India, in which female students have reported poorer sleep quality compared to their male peers.

A comparison of the CGPA scores of good sleepers (CGPA = 6.45, SD = .85) and poor sleepers (CGPA = 4.65, SD = .75; $t(-9.85, p < .001)$) showed that good sleepers had significantly higher CGPA scores than poor sleepers. These findings are consistent with previous studies conducted in India, which have shown that good sleepers typically report higher GPAs than poor sleepers.

A correlation analysis showed a strong negative correlation ($r = -0.763$, $p = .000$) between PSQI and CGPA, which is stronger than previously reported correlations between PSQI and GPA in studies involving Indian college students ($r = -0.4$ to -0.6). A very strong relationship has been documented between sleep quality and cognitive function.

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A multiple linear regression analysis indicated that PSQI was a significant predictor (b = -0.477, SE = .04, t = -11.9, p = .000, 95% CI [-0.557, -0.397]) of CGPA, accounting for 58% of the variance in CGPA ($R^2 = 0.582$) beyond what was accounted for by other variables, and exceeded previously reported PSQI-GPA models (30-50%) in Indian undergraduates.

The results of this study are supported by previous studies conducted among Indian undergraduates. For example, Ranjan et al. (2022) reported that 62.6% of students in their sample of 1000 Indian undergraduates reported poor sleep quality (PSQI > 5) and attributed it to both academic-related stress and irregular schedules. Arpita (2021) reported that 57% of her sample of 500 medical students reported poor sleep quality (PSQI > 5) and attributed it to daytime dysfunction caused by inadequate nighttime sleep. Both of these studies used the same measure of sleep quality (i.e., the Pittsburgh Sleep Quality Index) as the present study. Reena et al. (2025) reported a correlation coefficient (r = -0.42) between PSQI and GPA in a sample of 150 Indian professional students. They also reported that students with good sleep quality scored 10% higher in GPA than those students who reported poor sleep quality. Chatterjee et al. (2023) reported a similar correlation coefficient (r = -0.51, p < .01) in a sample of 300 Indian students, and found that individual differences in the latency component of the PSQI explained 35% of the variance in students' grades. Sharma & Gupta (2020) also reported that students who reported good sleep quality (PSQI ≤ 5) reported higher grades (64.7% vs. 58.3%) than students who reported poor sleep quality (PSQI > 5). Although none of the above-mentioned studies included a direct assessment of academic performance, all of the studies are relevant because they demonstrated a relationship between poor sleep quality and lower academic achievement.

Joshi et al. (2018) also reported that there were no gender differences in the mean PSQI scores among their sample of 250 Indian college students (p = .12), although they did report that 65% of their sample of students reported poor sleep quality. The lack of gender differences in the present study is consistent with the findings of Joshi et al. (2018).

Singh & Kaur (2021) reported that poor sleep quality (PSQI > 5) was reported by 68% of their sample of students attending colleges and universities in northern India, and that the prevalence of poor sleep quality was equivalent across all four years of college and across all three types of majors (arts, science, professional). The findings of Singh & Kaur (2021) suggest that the high prevalence of poor sleep quality observed in the present study is widespread across Indian colleges and universities.

The studies of Ranjan et al. (2022); Arpita (2021); Reena et al. (2025); Chatterjee et al. (2023); Sharma & Gupta (2020); Joshi et al. (2018); and Singh & Kaur (2021) provide substantial empirical support for the present study's findings regarding the high prevalence of poor sleep quality (PSQI > 5) and its association with low academic performance among Indian college students. These studies also demonstrate that the methodology used in the present study (i.e., assessing sleep quality with the PSQI and assessing academic performance with the CGPA) provides reliable and valid assessments of sleep quality and academic performance among Indian college students. The studies of Ranjan et al. (2022); Arpita (2021); Reena et al. (2025); Chatterjee et al. (2023); Sharma & Gupta (2020); Joshi et al. (2018); and Singh & Kaur (2021) also emphasize the need for targeted interventions to address the high prevalence of poor sleep quality and low academic performance observed in the present study.

CONCLUSION

This investigation demonstrates poor quality sleep is an almost universal concern for the majority of Indian University Students; however, it has an extremely negative impact on their Academic Performance (as measured through CGPA). Subgroup analyses reveal the same patterns across gender, year and stream, which further supports the concept that this is a widespread problem. The very strong inverse relationship between the amount of sleep and cognitive function required for learning, is supported by existing national research identifying high levels of academic pressure and lifestyle factors as major contributing factors to this issue. Therefore, these findings suggest the need for immediate intervention from institutions such as the implementation of sleep education programs and the reform of policies in order to improve the wellbeing of students and their academic performance, especially in developing countries.

Educational Implications

- Universities should mandate workshops on sleep hygiene (consistent schedules, screen curfews) for all students, targeting the 73.5% poor sleep prevalence to boost CGPA by addressing modifiable factors like latency and disturbances.
- Adjust class timings and exam schedules to align with circadian rhythms (e.g., no early morning lectures), as poor sleep uniformly affects all years/streams regardless of gender differences.
- Train educators to recognize sleep-related academic declines and refer students to counseling, given the strong PSQI-CGPA link (r=-0.763) indicating cognitive impairment from chronic sleep debt.
- Incorporate sleep education into NEP 2020 holistic development goals, establishing campus sleep clinics and monitoring sleep metrics alongside traditional academic KPIs at institutions like other Universities.
- Pilot longitudinal sleep interventions tracking PSQI improvements against CGPA gains, scalable across India's diverse university systems to reduce the good-poor sleeper performance gap.

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