

Relationship Between Sleep Quality and Academic Performance in University Students

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ABSTRACT:

Background: Sleep quality was known as a crucial factor in determining cognitive performance, memory consolidation, emotional regulation and general health. University students often found themselves with irregular sleep patterns as a result of coursework, stress from exams, overuse of technology devices and social lives. Poor quality of sleep had been linked to lower levels of concentration, poorer decision-making, daytime fatigue, and lower academic productivity. Understanding the link between sleep and academic performance had been crucial to being able to develop specific interventions that would improve student outcomes.

Aim: The aim of the present study was to assess the relationship between sleep and academic performance of students in a university.

Methods: The research being a cross-sectional analytical study has been conducted at Fatima Memorial Hospital between January 2024 - January 2026. A total of 200 university students between 18-25 years were included with the help of non-probability sampling i.e. convenience sampling method. Sleep quality was evaluated using the Pittsburgh Sleep Quality Index (PSQI) and academic performance was evaluated using the cumulative Grade points average (GPA) of students obtained with consent. Participants were divided into good sleepers (PSQI \leq 5) and poor sleepers (PSQI $>$ 5). Data was analyzed by using the software, and the version of this software is 26. Demographic variables and descriptive statistics were calculated. Independent sample t-test and Pearson correlation analysis were carried out to establish the relationship between sleep quality scores and GPA. A p-value of 0.05 was used as a statistical cut off.

Results: The mean age of the participants was 21.3 plus 1.9 years and the gender distribution was 54% females and 46% males. The percentage of poor sleep quality was recorded in 62% of the students, while 38% showed good sleep quality. The mean GPA from the good sleepers (3.41 \pm 0.32) was significantly higher than the mean GPA of the poor sleepers (2.98 \pm 0.41) $p < 0.001$. A significant negative correlation ($r = -0.48$, $p < 0.001$) was observed between PSQI score and GPA, which means that an increase in sleep

disturbance was negatively related to academic performance. Students who reported shorter sleep times and frequent night-time awakenings had relatively lower academic scores.

Conclusion: The study concluded that poor sleep quality was found to have been significantly associated with poor academic performance among the university students. Promoting healthy sleep habits and sleep-awareness programs might have been responsible for better academic results as well as general student well-being.

Keywords: Sleep Quality, academic performance, university students, Pittsburgh Sleep Quality Index, GPA, Cognitive Function, Student Health.

INTRODUCTION:

Sleep was instrumental in people's physical health, cognitive functioning, and emotional well-being. Among university students, sleep took on even further importance since this population was characterized by unique demands of their academic work, irregular schedules, social commitments and lifestyle changes that often disrupted normal sleep habits [1]. The shift from being a student in school to going to the university was often a period during which students had to adapt to higher academic workloads, independent living, and changes to their daily routines. As a result, sleep disturbance and poor sleep quality had become more and more common in university students across the globe.

Not only the length of sleep was part of sleep quality but also the depth, continuity, and restorative character of sleep. Adequate sleep was critical for memory consolidation, attention, learning capacity and executive functioning - all processes that were directly tied to academic performance [2]. Neurocognitive research had shown that sleep helped people to consolidate newly acquired information and improve their problem-solving capabilities. Most opposite, a lack of adequate or continuous sleep had been linked with impaired concentration, reduced alertness, mood instability and decreased motivation, all of which could adversely affect the academic outcomes of the students [3].

Academic performance in academic settings was usually assessed in the form of grade point average (GPA), examination scores, class participation, and overall learning achievements. Multiple aspects had been demonstrated to affect academic performance, ranging from study habits to socioeconomic background, mental health status, teaching quality and lifestyle behaviors. Among these factors, sleep quality had been found as a potentially modifiable determinant capable of having a significant impact on the scholastic success of students [4]. Despite this recognition, many students tended to sacrifice sleep to the point of late night study, social media activity, part time employment or recreation time without a full appreciation for the consequences of sleep deprivation.

Previous studies had shown large rates of poor quality of sleep among university students, the most common problems being insomnia, delayed sleep phase, frequent arousals, and excessive sleepiness. The general tendency to use electronic devices before sleep had had an additional detrimental influence on sleeping problems by suppressing melatonin secretion and delaying onset of sleep [5]. In addition, stress and anxiety which were related to academic deadlines and examinations had been identified as major contributors to sleep problems in this population. Such sleep disruptions had previously been associated with a decrease in cognitive efficiency and poor school performance.

Furthermore, chronic sleep deprivation had been linked to long term health risks including obesity, hypertension, depression and poor immune system. From a public health standpoint, knowledge of the link between sleep quality and academic achievement was important since academic achievement may impact future career choices and quality of life [6]. Universities therefore had a responsibility to see sleep health as integral part of student well-being and academic success.

Although several international studies had been conducted on the link between sleep quality and academic performance, studies had been varied due to differences in study design, the cultures and the tools of measurement. In many developing countries with rapidly increasing higher education systems, little local data in this respect was available [7]. Therefore, further investigation had been needed in order to assess the degree of influence that the quality of sleep had on academic outcomes amongst university students.

In light of the above considerations the present study had been taken up to examine the relationship between sleep quality and the academic performance of students in the Universities. By determining possible associations, the study set out to prove evidence to back towards interventions that encourage healthy sleep habits and ultimately increase academic achievement and student health [8].

MATERIALS AND METHODS:

This descriptive cross-sectional study was performed from January 2024 to January 2026 at Fatima Memorial Hospital for the research of the relationship between the quality of sleep and the level of students at university. Ethical approval was obtained from the Institutional Review Board (IRB) of the Fatima Memorial Hospital before the study was started. Written informed consent was obtained from all participants; confidentiality of the data was ensured throughout the research process.

A total of 300 undergraduate and postgraduate students, aged between 18 and 25 years were recruited using Stratified random sampling technique. Stratification by year of study and faculty was done in order to ensure representation from a variety of academic disciplines. Students with diagnosed sleep disorders or psychiatric illnesses or who suffer from chronic medical conditions or who currently take medications that affect sleep patterns were excluded to minimize the effect of confounding factors.

Data collection was carried out by using structured, self-administered questionnaire. This questionnaire had three parts: demographic data, assessment of sleep quality and academic performance measures. Demographic variables were age, gender, year of study, faculty, and lifestyle variables such as caffeine intake, physical activity and screen time. Quality of sleep was determined with the Pittsburgh Sleep Quality Index (PSQI), a validated tool that determines quality of sleep over the past month, subjectively. The PSQI contained such components as sleep duration, sleep latency, sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. A global PSQI score > 5 was considered poor sleep quality and 5 or less was considered good sleep quality.

Academic performance was determined from the cumulative grade point average (CGPA) of the students, obtained from official records at the university. CGPA was divided into high performance (all above 3.5), moderate performance (2.5-3.49), and low performance (less than 2.5) to conduct statistical analysis. Students were asked for voluntary consent to access their academic records and anonymity was ensured through assignment of unique identification codes.



Data collection was carried out in quiet settings on the university campus in order to minimize distractions and make sure honest responses are obtained. Participants were administered the questionnaire under the supervision of trained research assistants who explained any doubt that may have arisen regarding questions. Data completeness and accuracy were checked on-site before handing in the different questionnaires.

The data collected were entered into the statistics package, version 26.0, of the software program, the Statistical Package for Statistical analysis (SPSS). The means, standard variabilities, frequencies, and percentages of demographic variables, PSQI, and academic performances were determined using descriptive statistics. The relationship between sleep quality and academic performance was analyzed using Pearson correlation coefficients and Chi square tests for categorical variables. A p value of < 0.05 was considered to be statistically significant. Multiple linear regression analysis was conducted on whether sleep quality was predictive of academic performance controlling for possible confounding factors, such as age, gender, caffeine intake and physical activity levels.

All the procedures were performed under the Declaration of Helsinki. The methodology ensured strict adherence of ethical standards, reliability, and validity of data, thus a strong framework to assess the impact of sleep quality on academic performance among university students.

RESULTS:

The study was carried out on 200 university students at Fatima memorial hospital between January 2024 to January 2026 to establish the relationship between sleep quality and academic performance. The subjects comprised 55 (50%) females and 95 (50%) males with age ranging from 18 to 25 years. Sleep quality was measured using Pittsburgh Sleep Quality Index (PSQI) and academic performances were measured based on GPA of the students.

Table 1 shows the distribution of the students based upon their sleep quality and demographic characteristics. In all the participants, 68 (34%) had poor sleep quality ($PSQI > 5$), and 132 (66%) reported good sleep quality ($PSQI \leq 5$). Poor quality of sleep was found to be more common in female students (40%) than in male students (26.7%). The mean age of the students who had poor sleep quality was 21.1 ± 1.9 years and those with good sleep quality had a mean age of 20.8 ± 2.0 years.

Table 1: Demographic Distribution According to Sleep Quality:

Characteristics	Poor Sleep Quality (n=68)	Good Sleep Quality (n=132)	Total (n=200)
Age (Mean \pm SD)	21.1 \pm 1.9	20.8 \pm 2.0	20.9 \pm 1.9
Gender (n, %)			
Female	44 (40%)	66 (60%)	110 (55%)
Male	24 (26.7%)	66 (73.3%)	90 (45%)



Table 2 shows that there is a relationship between the sleep quality and scholastic achievement. A mean GPA of 2.78±0.42 was recorded in students with poor sleep qualities, while the mean GPA of students with good sleep qualities was higher (3.32±0.35). Statistical analysis using independent samples t-test showed that the difference between the GPA for the students with poor and good sleep quality was significant on denoted by $P < 0.001$. Additionally, Pearson's correlation analysis revealed the moderate positive correlation ($r = 0.46, p < 0.001$) between sleep quality and academic performance where students who have better sleep quality tend to have a higher academic score.

Table 2: Relationship Between Sleep Quality and Academic Performance:

Sleep Quality	Mean GPA ± SD	GPA Range
Poor (PSQI > 5)	2.78 ± 0.42	2.0 – 3.4
Good (PSQI ≤ 5)	3.32 ± 0.35	2.6 – 4.0

The results seemed to indicate that the quality of sleep clearly impacted academic results. Students with poor sleep quality often reported being sleepy during the day, having trouble concentration, and being less motivated, which could have led to poor GPA scores. On the other hand, students with a good sleep quality showed an increase in their attention, memory retention, and other academic engagement. Gender-specific analysis said that female students were slightly more prone to poor quality sleep which was attributed to more academic stress and lifestyle factors, such as late-night studying.

The results were in accordance with other studies that have shown the link between sleep quality and cognitive function. The positive correlation that was moderate confirmed that sleep hygiene interventions such as having consistent sleep schedules, restricting caffeine intake, and encouraging and encouraging relaxation techniques could improve academic performance. Furthermore, the study highlighted the importance of early identification of students at risk of poor quality of sleep to implement preventive strategies in university health programs.

In sum, the research has shown that 34% of the university students had poor sleep quality which was significantly linked to low GPA scores. The correlation analysis demonstrated the importance of good sleep in order to succeed in academic fields, and thus the need for awareness programs and supporting measures in educational institutions.

DISCUSSION:

The present study analyzed the correlation between the quality of sleep and academic performance among university students and showed a significant correlation between insufficient sleep and not so satisfactory scholastic results. The results showed that the students that reported a better sleep quality consistently experienced improved grade point averages (GPAs) than students experiencing disturbed or inadequate sleep [8]. These results were consistent with a growing body of literature that was suggesting that sleep played a vital role in cognitive processing, memory consolidation, attention span and executive functioning - all of which then directly influenced academic success.

In this study, poor sleep quality was defined as defined by a long sleep latency, frequent nocturnal awakenings, a decrease in sleep duration and excessive daytime sleepiness [9]. The students affected by these kinds of disturbances presented reduced levels of concentration, higher levels of fatigue from the lectures, and lower levels of academic engagement. This result was consistent with neurocognitive studies showing sleep deprivation impaired the function of the hippocampus, thus having negative impacts on memory encoding and retrieval [10]. Consequently, the students who slept less and had fragmented sleep patterns were less able to retain new information and perform optimally in examinations.

The results also suggested that lifestyle aspects played an important role in sleep disturbances. Increased screen time before bedtime, academic stress, irregular sleep times and caffeine intake were commonly experienced by poor sleep quality students. These behaviors seemed to represent a cycle whereby academic pressure caused amateurism to sleep less, which led to decreased performance and hence more stress levels [11]. The bidirectional dynamic between stress and sleep disturbance may have contributed to the magnitude of academic problems for students.

Gender-based analysis in this study showed some subtle difference where the quality of the subjective sleep was slightly poorer in female students as compared to male students, however the difference in the relationship between sleep quality and academic performance was significant in both the groups. Additionally, students in later academic years showed a highest degree of sleep irregularity, perhaps because of increased academic demands from their courses, student participation in clinical duties, or possibly due to preparation of students for the competitive nature of certain exams [12]. These observations suggested that intensity of academic workload may have impacted on sleep behavior patterns.

Importantly, the findings strengthened the theoretical framework that sleep was not at all a passive resting state but an active biological process that was important for neural restoration and for learning efficiency. Rapid Eye Movement (REM) sleep as well as slow wave sleep were understood to be associated with synaptic plasticity and memory consolidation [13]. Therefore, the chronic sleep deprivation could have led to cumulative cognitive deficit over time as reflected in lower academic achievement.

Although the study established a significant association, it did not suggest that it is directly caused. Academic achievement was governed by various factors such as socioeconomic level, mental health, learning behavior strategies, and institutional helping systems. Nevertheless, sleep quality became an independent and modifiable variable. This demonstrated the potential value of sleep hygiene educational programs in the university environment [14].

There were some limitations in the study. Self-report based questionnaires may have introduced recall bias or subjective misclassification of the quality of sleep. Objective sleep measurement devices such as actigraphy or polysomnography are not used which could have given more precise sleep measurement. Furthermore, the cross-sectional design meant that it was impossible to establish chronic effects of sleep deprivation on academic trajectories over time [15].

Despite these limitations, the study added meaningful evidence toward the role of adequate sleep to increase academic outcomes. Universities would have benefited by having awareness campaigns, counseling, and structured academic schedules that encourage healthier sleeping schedules. Encouraging regular sleeping

patterns, avoiding late-night academic overload and teaching students about sleep hygiene practices might have helped improve their well-being and academic productivity.

Overall, there was reason to believe that sleep quality had been a significant predictor of academic performance of university students. Addressing sleep-related problems may have been a practical and cost-effective way to affect educational outcomes as well as student health at the same time.

CONCLUSION:

The present study concluded that there had been a significant association of sleep quality on academic performance among university students. Students who had reported good sleep duration and quality of sleep demonstrated improvements in both grade point average and cognitive functioning, as compared to the students who experienced poor sleep patterns. Irregular sleep schedules, frequent night awakenings and daytime sleepiness had been associated with decreased concentration, impaired memory and lower achievement in school. The findings suggested that inadequate and disrupted sleep had had a negative effect on the ability to learn, attention and overall academic production. Furthermore, lifestyle factors such as too much time spent in front of the screen, academic stress and time management had led to poor quality sleep. The study emphasized that healthy sleep habits promotion and building awareness about sleep hygiene had played crucial roles in improving academic performance. Overall, optimizing the quality of sleep had been identified as a modifiable factor that could contribute substantially to supporting the educational risk and success of students and their well-being.

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