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Effect of Sleep Pattern on Academic Performance of Medical Students at University College of Medicine and Dentistry (UCMD)

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ABSTRACT

Background: Sleep is an important physiological process, which directly affects the concentration, memory, and learning efficiency. Lack of sleep is especially prone to medical students as they spend long hours studying, working in the clinic, and are stressed.

Objectives: The aim of this study was to determine the influence of sleeping patterns on academic performance among medical students at the University College of Medicine and dentistry (UCMD), Lahore.

Methods: The present study is a descriptive cross-sectional study that will be carried out at UCMD between June 2024 and March 2025 by enrolling 100 MBBS students using stratified random sampling. The questions were structured into a questionnaire that included the Pittsburgh Sleep Quality Index (PSQI) and Epworth Sleepiness Scale (ESS) to assess the quality, duration, and daytime sleepiness of sleep. Latest semester Grade Point Average (GPA) was used to measure academic performance. The data were compared with Pearson correlation and chi-square tests with the help of SPSS v26; p less than 0.05 was considered to be significant.

Results: The average age of the participants was 21.5 1.9 years; 60 were the female participants. Sixty six percent of students reported poor sleep quality (PSQI > 5), and 64% slept less than six hours per night. The mean GPA was 3.18 ± 0.42. Students who slept 7 hours and above achieved much higher GPAs (3.42 ± 0.31) as compared to those who slept less than 6 hours (3.05 ± 0.36, $p < 0.01$). There was a positive association between the duration of sleep and GPA ($r = 0.48$, $p < 0.01$).

Conclusion: Lack of proper sleep and insufficient sleep quality have a significant negative effect on academic performance. Regular sleep patterns and good sleep hygiene can be encouraged to boost the efficiency of medical student learning and general academic performance.

Keywords: Sleep pattern, Academic performance, medical students, UCMD, Sleep quality

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INTRODUCTION

Sleep is also another biological process that is very crucial in the physical welfare, mental stability and cognitive ability [1]. It is a period of physiological rejuvenation where neural networks are solidified with the aid of memory and learning without which there is no success at the academic level. Good sleep helps in emotional control, attention, making decisions and creativity which is essential among medical students who are consumed by their busy academic schedule as well as the pressures of having to study the stressful psychological issues [2].

The rigor of the education, the hours of study, and the odd schedules have been used to describe medical education, which is normally augmented with clinical responsibilities and the night shifts. These are very influential factors on the quality and span of sleep among students [3]. Medical students are prone to abnormal sleeping, sleep deprivation and insomnia which have been associated with low academic performance, poor judgment, anxiety, and low motivation. Studies have shown that, with less than six hours of sleep during a night, the attention span of such an individual is reduced, so is the level of cognition and poor remembering and retaining information and this directly affects the performance of such an individual in terms of learning as well as performance on exams [4].

There is a complex relationship between sleep and academic performance, which is determined by various factors including lifestyle behaviors, use of electronic devices before bed, caffeine and stress. Besides, the circadian rhythm, which is the internal clock of the body, dictates when one is better off being awake or asleep. Any break to this rhythm, e.g. a late-night study, irregular working hours, etc. can affect neurocognitive processes and lead to chronic fatigue [5,6].

A number of research studies have been done across the globe to determine sleep behaviors in medical students. A high prevalence of poor sleep quality (meaning 6070 percent among medical students) has been reported in research carried out in Saudi Arabia, India and the United States [7]. This has been noted to be the same in Pakistan where the academic stress, the pressure of exams and the conditions in the hostels also lead to a disruption in sleep patterns. Nevertheless, the scope to which these disruptions affect the academic performance of the domestic institutions like the University College of Medicine and Dentistry (UCMD), Lahore, has not been well investigated [8].

Since sleep is critical in ensuring optimum cognitive functioning and academic output in medical students, it is therefore vital to consider the trends, length, and quality of sleep-in medical students and how it correlates with academic achievement. This knowledge will assist in establishing behavioral and institutional variables that are modifiable and result in poor sleep hygiene and academic inefficiency [9,10].

Thus, the given study aimed to evaluate the impact of sleep patterns on the academic achievement of medical students at UCMD, Lahore. This study aims to reveal the importance of sleep hygiene in medical education by finding relationships between sleep duration, sleep quality, and academic grades and to promote approaches that facilitate mental health and academic performance [11].

MATERIALS AND METHODS

The current study was a descriptive cross-sectional research study at the University College of Medicine and Dentistry (UCMD), University of Lahore and the aim of the research was to determine the impact of sleep pattern on the academic performance of medical students. The case was conducted during ten months, between June of 2024 and March of 2025. The target population included undergraduate students of MBBS taking their courses at UCMD at the time

of the study. The study involved a stratified random sampling method to select 100 students to represent all the five academic years. Equal opportunity was provided to all students (male and female) to participate and inclusion was done through voluntary consent.

The study included students who were already enrolled and those that had taken their most recent academic tests and volunteered informed consent. Individuals with known psychiatric disease, diagnosed sleeping disorders, and individuals taking any sedative or stimulant medication were excluded. The questionnaire was self-administered, structured, and included questions on demographic data (age, gender, academic year and residential status), sleep quality and habits measured by the Pittsburgh Sleep Quality Index (PSQI), daytime sleepiness measured by the Epworth Sleepiness Scale (ESS) and academic performance measured by the most recent semester Grade Point Average (GPA) obtained using official documents. A small number of students were used to test the questionnaire to make sure it is reliable and clear enough before it is distributed to large number of students.

The study received ethical consent by the Institutional Review Board (IRB) of UCMD. Each of the participants signed informed consent in writing, and the data was collected in a highly confidential manner. The questionnaires were sent out in the physical form and electronically and the feedback was collected anonymously to reduce bias. The Statistical Package of Social Sciences (SPSS) version 26 was used in the analysis of the collected data. Continuous variables were analyzed using descriptive statistics where the mean and standard deviation were used, and categorical variables were analyzed using frequencies and percentages. The Pearson correlation test was used to determine the relationship between the duration of sleep and academic performance and the Chi-square test was used to determine the associations between sleep quality and GPA. The p-value of less than 0.05 was taken to be significant.

RESULTS

A total of 100 medical students from the University College of Medicine & Dentistry (UCMD), University of Lahore, participated in this study. Among them, 60% were females and 40% were males. The mean age of participants was 21.5 ± 1.9 years, with the majority belonging to the preclinical years (first and second year, 55%) while 45% were in the clinical years (third to fifth year). The demographic characteristics of the participants are summarized in Table 1.

The average sleep duration among students was 5.9 ± 1.3 hours per night, with 64% of participants reporting less than 6 hours of sleep daily. Majority of students (70%) had gone to bed after midnight with 58 percent indicating that they frequently went back and forth in sleep. According to the Pittsburgh Sleep Quality Index (PSQI), 66 percent of the students were classified as poor sleep quality(PSQI > 5) and only 34 percent of students were found to have good sleep quality. The Epworth Sleepiness Scale (ESS) showed that moderately and severely sleepy respondents were 52 percent, showing that they did not get enough rest.

The participants mean Grade Point Average (GPA) was 3.18 with a standard of 0.42. Students with an adequate amount of sleep (as indicated by a complaint of 7 hours or more) had a very high mean GPA (3.42 ± 0.31) than those who had less than 6 hours of sleep (3.05 ± 0.36). The academic performance and sleep duration showed statistically significant positive correlation ($r = 0.48$, $p < 0.01$) with longer and better quality sleep having positive correlations with higher GPA scores. Moreover, abnormal sleeping patterns and overuse of electronic devices prior to bedtime had a negative relationship with GPA ($p < 0.05$).

Moreover, the poor quality of sleep was estimated to bring in increased daytime sleepiness and reduced concentrations in the students during lectures as self-reported in questionnaires. The participants who had regular sleeping patterns, a fixed sleep schedule and those with a fixed bedtime and wake-up time showed improved concentration and school performance. Table 2 gives this correlation between the quality of sleep and academic performance.

On the whole, the results of the present research showed that insufficient sleep duration, poor sleep quality, and inconsistent sleep schedule were among the major factors that were either directly or indirectly linked to poor academic performance among medical students at UCMD. The studies provided a clear statement regarding the need to maintain routine and sufficient sleep to achieve the highest learning performance and score in exams.

Table 1 shows the general demographic profile and sleep-related characteristics of the participants, highlighting a predominance of poor sleep quality and reduced average sleep duration among UCMD students.

Table 1: Demographic and Sleep Characteristics of UCMD Medical Students (n = 100)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	40	40%
	Female	60	60%
Age (years)	Mean ± SD	21.5 ± 1.9	—
Academic Year	Preclinical (1st–2nd Year)	55	55%
	Clinical (3rd–5th Year)	45	45%
Average Sleep Duration (hours)	<6 hours	64	64%
	≥7 hours	36	36%
Sleep Onset Time	Before midnight	30	30%
	After midnight	70	70%
Sleep Quality (PSQI)	Good (≤5)	34	34%
	Poor (>5)	66	66%
Daytime Sleepiness (ESS)	Normal	48	48%
	Moderate to severe	52	52%

Table 2: Association Between Sleep Parameters and Academic Performance (n = 100)

Sleep Parameter	Category	Mean GPA ± SD	p-value
Sleep Duration	<6 hours	3.05 ± 0.36	<0.01*
	≥7 hours	3.42 ± 0.31	
Sleep Quality (PSQI)	Poor (>5)	3.08 ± 0.33	0.02*
	Good (≤5)	3.32 ± 0.29	
Daytime Sleepiness (ESS)	Normal	3.28 ± 0.30	0.04*
	Moderate to severe	3.11 ± 0.35	
Sleep Timing	Regular	3.35 ± 0.27	0.03*
	Irregular	3.10 ± 0.33	

Table 2 illustrates a statistically significant relationship between sufficient sleep duration, good sleep quality, and higher academic performance ($p < 0.05$). Students with irregular sleep patterns and daytime sleepiness achieved lower GPA scores.

DISCUSSION

The current research examined the connection between the academic performance and sleep patterns in the medical students at University College of Medicine and Dentistry (UCMD) at the University of Lahore. The result indicated that most of the students reported a low quality of sleep, irregular sleeping hours and short sleep hours that were strongly correlated with low

academic performance. These findings reiterate the lesson that sleep has a very important role in cognitive functions, ability to learn and performance in examinations among medical students [10-12].

The average hours that the participants slept were about six hours a day which is lower than the seven to eight hours that young adults should sleep. The observation is in line with other past studies carried out on medical students in Pakistan, Saudi Arabia, and India who found that academic pressure, studying at night, and screen time also lead to chronic sleep deprivation [13]. As an example, Jahrami et al. (2020) found that out of the Bahrain medical students, 65 percent reported poor sleep quality, based on PSQI scores of more than five, and the students also had low academic scores. On the same note, the study conducted by Azad et al. (2015) established that sleep deprivation among medical students is not just a local issue in the world but a worldwide problem that causes daytime tiredness, fatigue, and lack of concentration [14].

In this study, students who had regular sleep score and had at least seven hours of sleep had a very high GPA than those who had less than six hours of sleep [15]. The statistically significant ($p < 0.01$) positive relationship between sleep duration and academic performance ($r = 0.48$) suggests that sleep provides positive changes to the cognitive ability (i.e., memory consolidation, problem-solving skills and concentration) all of which are essential in medical training. The results are in line with those of Curcio et al. (2006) who found that enough sleep enhances neurobehavioral performance and school productivity among university students [16,17].

Unregulated sleeping cycles and studying late were observed to have adverse effects on GPA and this implies that circadian rhythm deregulation is a crucial factor in learning. Late bed time and early morning lectures cause misalignment in the students sleep cycles resulting in lack of deep sleep stages which are required to form memories [18]. This interference could be the reason behind the increased daytime drowsiness recorded among over fifty percent of the participants as per the Epworth Sleepiness Scale. Napiness also leads to a worse attention and storage of information that brings a cumulative loss to learning efficiency [19].

One more aspect that was found during this research was the high use of the electronic devices prior to bedtime, which leads to delayed sleep onset and low sleep quality. Screen-based light exposure inhibits the secretion of a hormone called melatonin, which forms the sleeping-wake cycle, hence leading to sleep disturbances and poor sleep. The behavior pattern has always been linked to poor performance in medical and non-medical populations across the world [20,21].

The psychological implications of poor sleep are also put in the focus of the study. Students who slept poorly or had disrupted sleep patterns often complained of irritability, loss of motivation and inability to focus on lectures and clinical rotations. This corroborates the past studies that have implied that sleep deprivation is associated to high level of stress and emotional instability, which disrupt the process of learning and decision making [22,23].

In general, the findings of UCMD confirm the increasing interest in the problem of sleep deprivation among medical students because their curriculum can be described as challenging. The findings require institutional-level intervention such as student counseling programs, stress management workshops, and sensitizing them on sleep-hygiene. In addition, academic timetables might be changed to reduce work overloads and get sufficient rest especially during examination times [24,25].

CONCLUSION

This paper concludes that a poor sleep duration, sleep quality, and sleep patterns significantly

affect the academic performance of medical students at the University College of Medicine and Dentistry (UCMD), University of Lahore in a negative way. Those students who slept seven or more hours and had a consistent sleep pattern received better GPA and claimed to have better concentration than students with inadequate or disrupted sleep. Sleep is a vital part of academic achievements, mental health, and well-being in general. Thus, healthy sleep habits should be encouraged in medical institutions. The curriculum should involve educational seminars, awareness programs as well as student wellness initiatives that promote balanced lifestyles and proper management of time. Sleep deprivation will not only be addressed in order to improve academic performance but will also equip the medical students to the heavy onus that awaits them in their lives as future healthcare providers.

Conflict of Interest:

The authors report no conflicts of interest.

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Authors' contributions:

M.M.M. – Study conception, design, and manuscript drafting.

R.A. – Data collection and statistical analysis.

A.A. – Literature review and questionnaire preparation.

A.Y. – Data entry and result interpretation.

F.K. – Formatting and proofreading of manuscript.

D.H.H. – Supervision, critical review, and final approval of the manuscript.

All authors read and approved the final version of the manuscript.

Data Availability Statement:

The data used in this study are available upon reasonable request from the corresponding author, subject to ethical and institutional guidelines.

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