

Research Article

Impact of Quality of Sleep on Academic Performance of Medical Students in Lahore

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Abstract:

Background: Good sleep improves cognitive performance, memory physical, and mental well-being. In the stressful and competitive atmosphere of medical school, maintaining an optimal sleep schedule becomes challenging and it can adversely affect the health of these students. Disturbances in sleep including poor quality of sleep, inadequate duration of sleep, and tiredness lead to poor cognition and memory. This can result in poor grades in school. The study investigated the influence of quality of sleep on the educational achievements of medical students in Lahore, thus highlighting the importance of regular optimal sleep and mental well-being.

Methodology: The study included 239 students from various medical institutes in Lahore. We used Pittsburgh Sleep Quality Index (PSQI) to estimate the quality of sleep. The academic outcome was evaluated based on percentages of participants' marks throughout medical school. Questionnaires were distributed via WhatsApp or email. The correlation between sleep quality and learning outcomes was analyzed using the univariate analysis of variance test.

Results: The study found that 64% of the individuals had poor sleep quality, which was significantly more associated with poor grades compared to good sleep quality. The p-value for the relationship between quality of sleep and academic outcome was <0.05.

Conclusion: In conclusion, our study highlights that poor sleep quality leads to poor academic performance, emphasizing the crucial role of sleep quality in determining academic outcomes in the student population.

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INTRODUCTION:

Medical education is demanding and stressful. Due to the need to learn a vast amount of knowledge in a limited period often medical students experience high levels of stress. As a result of academic stress, they are prone to experience poor quality of sleep. Adequate amounts of quality sleep improve learning, cognition, and concentration.¹⁻⁴ For adults, regular sleep duration of 7-9 hours is generally considered optimal for most individuals.²

There is growing literature on this subject, but the conclusions of various studies are contradictory. Some studies suggest that poor sleep quality is linked to low educational achievement, however, others suggest otherwise. A study at Kathmandu Medical College, Nepal revealed that 44.23% of medical students experienced poor sleep quality which was evaluated using the Pittsburgh Sleep Quality Index (PSQI).³ Poor quality of sleep can lead to impaired cognition and a decline in academic performance as evidenced by a study in a public university in Karachi that found that medical students who slept poorly scored lower GPAs than those with good sleep quality.⁴ Another research revealed that sleep disturbances were more common among clinical students than preclinical students.⁵ In an Indian study, around 66% of the participants were sleep deprived and it had a significant effect on their academic performance.⁶ In addition to adverse academic performance, poor quality of sleep can also lead to psychological distress, contributing to the symptoms of anxiety and depression.⁷ A study at Rawalpindi Medical University in Pakistan revealed that students who reported higher physical activity and

better sleep quality had higher academic performance.⁸ A study from Riyadh, Saudi Arabia, found that 77% reported poor sleep quality and 63.5% experienced stress, yet they did not discover any effect of sleep quality or stress on educational outcomes.⁹ A study at PSG Institute of Medical Science in India found that quality of sleep had no relationship with academic achievement.¹⁰ In another Saudi research, 63.2% of medical students had poor sleep quality, which contributed to higher rates of depression, nervo-usness, and stress. Surprisingly, poor sleepers performed better academically.¹¹ Sleep disturbances also lead to poor quality of life and mental health.¹²⁻¹³

According to the studies reviewed above, sleep problems are widespread among medical students due to the demanding nature of their academic activities. The purpose of this study is to evaluate the sleep habits of students from various medical institutes in Lahore and examine its influence on their academic performance. Conducting further research in this area can raise awareness among medical students and professionals about the importance of maintaining optimal sleep duration that improves their physical and psychological health. Given the limited research on this subject in Pakistan, this research aimed to assess sleep quality and explore its relationship with academic performance among medical students.

MATERIALS AND METHODS:

- Cross-sectional Study
- Various Public and Private medical institutes in Lahore including King Edward Medical University, Allama Iqbal Medical College, Fatima Jinnah Medical University, Services Institute

of Medical Sciences (SIMS), FMH College of Medicine & Dentistry, Avicenna Medical College, Akhtar Saeed Medical & Dental College and University College of Medicine & Dentistry (UCMD).

- The research lasted nine months, from January 2019 to September 2019.
- 239 students were included and the level of significance was 5%.
- Convenient sampling.
- Students registered to the MBBS program at their respective institutes, had passed at least the 1st year of MBBS and gave informed consent.
- Students who had not attempted the 1st professional (part I) examination or who did not give informed consent.

The Pittsburgh Sleep Quality Index (PSQI), a self-report questionnaire that evaluates sleep quality, was used to assess sleep quality.¹³ The PSQI is a validated instrument that has been used in numerous studies to quantify sleep quality. The educational outcome of the participants was quantified by the percentages of their marks throughout their medical school years. The questionnaires were distributed to the students using WhatsApp or email.

The data was collected using SPSS 28. The gender of the participants was cross-tabulated with their year of study to present the number of male and female students in each year of MBBS. A descriptive analysis was conducted to present the frequency of students with poor and good sleep quality. The mean percentages of marks in each year of MBBS were

compared with the independent variable of sleep quality to present the mean percentages of marks for students in each year of MBBS based on their sleep quality. Univariate ANOVA was employed to establish the statistical significance of the association between sleep quality (independent variable) and academic performance (dependent variable).

Approved by Institutional Review Board (IRB) was obtained. There is no conflict of interest and there is no source of funding.

RESULTS:

A total of 239 students from various medical institutes in Lahore participated in the study. Among these participants, 56.1% were males (n = 134), while 43.9% were females (n = 105). Most of the students (72.4%) had ages between 21 and 22 years. The average age of the individuals was 21.71 ± 1.09. The distribution of students across different years of the MBBS course revealed that fourth-year students had the highest frequency, accounting for 64% of the participants (n = 153). (Table-1)

(Table-1) Gender of Subject -Year of Current Study

		Year of Current Study				Total
		2nd year	3rd year	4th year	5th year	
Gender of Subject	Male	23	31	68	12	134
	Female	5	10	85	5	105
Total		28	41	153	17	239

Pittsburgh Sleep Quality Index (PSQI) scale was employed as an indicator of sleep quality. It analyses various dimensions of sleep quality and distur-

bances¹⁴. It assesses various factors like the overall quality of sleep, sleep latency, duration of sleep, habitual sleep efficiency, sleep disturbances, usage of sleep medication, and impairment during the day. Every component is evaluated from 0 to 3, with higher ratings indicating lower sleep quality.¹⁵

Participants completed the PSQI questionnaire, and their scores on each component were recorded and then summed to determine the overall sleep quality of the participants. A score of less than 5 out of 21 is interpreted as “Good Quality of Sleep” while a score of ≥ 5 out of 21 is regarded as “Poor Quality of Sleep”. The findings exhibited that 64% of the respondents slept poorly and 36% of the participants had a good quality of sleep (Table-2).

Table-2: Frequency of Participants with Poor Quality and Good Quality of Sleep

	Frequency	Percentage
Poor Quality of Sleep	153	64.0
Good Quality of Sleep	86	36.0
Total	239	100.0

The academic performance of the participants was assessed by recording the percentages of marks obtained by the students in each year of their medical school. The mean percentages and standard deviations for each year are as follows (Table-2):

- **First Year:** The mean percentage of marks obtained by first-year students was 68.44%, with a standard deviation of 6.4%.
- **Second Year:** Second-year students achieved a mean percentage of marks of 70.71%, with a standard deviation of 6.7%.

- **Third Year:** The mean percentage of marks for third-year students was 67.31%, with a standard deviation of 9.074.
- **Fourth Year:** Fourth-year students obtained an average percentage of marks of 67.41%, with a standard deviation of 6.89%.

These data provide insights into the performance trends of medical students across different years of study. The standard deviations indicate the degree of variability in academic performance within each year.

Table-3: Mean Percentages of Marks in Each Year of Medical School

	N	Mean	Std. Deviation
Mean Percentage of Marks in 1 st Year	23	68.44	6.474
Mean Percentage of Marks in 2 nd Year	9	70.71	6.764
Mean Percentage of Marks in the 3 rd Year	21	67.31	9.074
Mean Percentage of Marks in 4 th Year	1	67.41	6.893

To study the connection between the Sleep standard and the Academic success of these students their quality of sleep was tabulated against the mean percentages of their marks in professional examinations. It revealed that the students with good-quality sleep scored better than the other group. (Table-4)

Table-4: QUALITY OF SLEEP AND ACADEMIC PERFORMANCE

QUALITY OF SLEEP		Mean	Mean	Mean	Mean
		Percentage of	Percentage of	Percentage of	Percentage of
		Marks in	Marks in	Marks in the	Marks in
		First Year	Second Year	Third Year	Fourth Year
Poor Quality of Sleep	Mean	67.27	69.1811	65.4694	69.0000
	N	153	127	98	11
	Std. Deviation	6.332	6.70041	8.59178	7.04273
Good Quality of Sleep	Mean	70.51	73.0238	69.8194	64.5000
	N	86	84	72	6
	Std. Deviation	6.234	6.21304	9.16873	6.09098
Total	Mean	68.44	70.7109	67.3118	67.4118
	N	239	211	170	17
	Std. Deviation	6.474	6.76383	9.07382	6.89256

To further explore the relationship between sleep quality and academic performance, univariate analysis of variance (ANOVA) tests were conducted for each year group. The results revealed that the quality of sleep significantly affects academic performance as shown in **table-5**

Table-5: Univariate ANOVA Results for Quality of Sleep and Academic Performance

Dependent Variable	Independent Variable	p-value	Partial Eta Squared
Mean Percentage of Marks in 1 st year	Quality of Sleep	<0.001	.058
Mean Percentage of Marks in 2 nd year	Quality of Sleep	<0.001	.078
Mean Percentage of Marks in 3 rd year	Quality of Sleep	.002	.056
Mean Percentage of Marks in 4 th year	Quality of Sleep	.208	.103

These results indicate that in the first, second, and third years of medical school, the effect of quality of sleep on educational outcomes is statistically significant.

However, no significant relationship was found in the fourth-year students, although the effect size was still moderate.

To summarize the findings of this study, 64% of the students reported poor sleep quality. The participants with poor quality of sleep scored poorly in their annual examinations than those with good quality of sleep. This association was statistically significant (p-value <0.05) for the 1st, 2nd, and 3rd years of medical school, but not for the 4th year of medical school.

DISCUSSION:

Good quality of sleep improves learning and memory. It helps students perform well in their studies.⁴ The objectives of this research were to analyze the standard of sleep among medical students in Lahore and investigate its impact on their educational success. For this purpose, 239 medical students were recruited in

this study and we observed that 64% of the respondents were poor sleepers. This finding was in line with various other studies.^{4,6,11} The students with poor sleep quality showed poor academic performance as compared to their peers and the association was statistically significant.

The study showed that there is no statistically significant influence of sleep habits on academic achievement among fourth-year students. This may be because.

- The fourth-year students are more experienced in managing their study timetables.
- They may be more efficient in managing their sleep schedules than others.
- They may have mastered getting enough sleep even when experiencing the academic stress
- These probable causes may have helped them to score good marks in their examinations even when they were not having good quality sleep.

A study at Rawalpindi Medical University examined the impact of physical activity and sleep quality on academic outcomes among fourth-year MBBS students. The study included 219 participants who completed the Pittsburgh Sleep Quality Index (PSQI) and the Global Physical Activity Questionnaire (GPAQ). The data suggested that the students who engaged in more physical exercise and slept better performed better academically, as indicated by higher mean GPAs. Conversely, students with lower physical activity or poorer sleep quality had lower mean GPAs. These results suggest that physical activity and sleep quality are important factors influencing academic performance among medical students.⁸

Another study conducted at a public university in Karachi, Pakistan, involved 797 medical students. They utilized the Pittsburgh Sleep Quality Index (PSQI) to analyze sleep quality while the academic outcome was quantified using the self-reported GPA. Poor sleep quality was shown to be substantially related to decreased academic performance in the study. The findings included 64.24% of the students with poor quality of sleep. These students had a GPA of 2.92 on average. Students with high sleep quality (35.76%) had a GPA of 3.31 on average. GPA differences across groups were statistically significant ($p < 0.0001$).⁴

In line with this research, our study reported poor quality of sleep among 64% of the participants. Similarly, poor sleep quality was shown to be substantially related to low academic performance in these students. These findings suggest that inadequate sleep can lead to poor mental health and adversely impact academic performance.

There are several reasons why disrupted sleep may result in poor academic performance. Sleep is essential for learning and memory, and sleep-deprived students are not able to process information and learn it effectively. Additionally, sleep deprivation can lead to increased stress levels, which can also impair cognitive function.

Poor quality of sleep has been reported to lead to increased incidence of psychiatric disorders like anxiety, depression, daytime somnolence, and poor quality of life. A study conducted in 22 medical schools in Brazil included 1350 medical students and examined the relationship between restlessness, sleep

deprivation, quality of life, mental health issues, and the educational environment. The study discovered a substantial association between sleepiness and sleep deprivation with poor quality of life. Students reporting daytime fatigue and sleep deprivation had lower quality-of-life scores. Furthermore, sleepiness, sleep deprivation, and low quality of life were all associated with increasing levels of anxiety and depression.¹²

A study at Sulaiman Al Rajhi Colleges in Saudi Arabia found that sixty-three percent of medical students experienced inadequate sleep and that this was significantly associated with depression, anxiety, and stress. Interestingly, the poor sleepers academically performed better than those with good-quality of sleep.¹¹

Our study found similar results, with 64% of students reporting poor sleep quality, but a significant association between poor sleep quality and poor academic performance. However, there are a few possible explanations for the contradictory findings between our two studies.

- It is possible that the poor sleepers in the Saudi Arabian study were more motivated to succeed.
- They may have compromised their quality of sleep to achieve academic excellence.
- The participants in the Saudi Arabian research may have different sleep habits and patterns as compared to the students in our study.

Overall, the findings of these studies suggest that there is a complex relationship between sleep quality and mental health with success in medical school. More research is needed to understand this relationship. Effective interventions must be devised to promote sleep hygiene and good sleep quality. These measures

will lead to improved physical and psychological well-being. They will also be effective in helping medical students achieve their academic goals.

- Students with poor sleep quality may also be more likely to have other problems, such as depression or anxiety, which could also contribute to their poor academic performance.

CONCLUSION:

Finally, the study looked into the sleep habits of students at several medical colleges in Lahore, as well as their impact on academic performance. The results showed that poor sleep quality was reported by 64% of participants, and that poor sleep quality was closely connected to subpar academic performance. These observations are consistent with earlier research showing that sleep deprivation results in cognitive decline.

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