

Sleep Quality Patterns, Determinants, and Academic Performance Impact among Medical Students in a Private Medical College, Lahore, Pakistan



Seema Hasnain¹, Soha Saif¹, Ahsan Asif¹

Abstract

Background: The study aimed to discern the sleep quality pattern, its determinants, and its impact on the academic performance of medical students in a private medical college in Lahore.

Methods: Conducted from June to December 2021, this descriptive cross-sectional study obtained ethical approval from the Institutional Review Board. Data were collected through a pretested self-administered questionnaire with sociodemographic and Pittsburgh Sleep Quality Index (PSQI) sections. SPSS version 20 facilitated data entry and analysis. The Chi-square test ($p < 0.05$) examined sociodemographic correlations, and a revised Chi-square assessed the relationship between PSQI score and GPA. Pearson Chi-square test explored associations between sleep patterns and influencing factors.

Results: Among 473 medical students, 78.2% exhibited poor sleep quality. Age, gender, and family type showed no significant relationship with sleep quality. However, a notable association emerged between sleep duration and students' study year ($p = 0.017$). The use of sleep medication and daytime dysfunction displayed significant associations with the study year ($p < 0.000$ and $p = 0.002$, respectively). Only final-year undergraduates demonstrated a statistically significant connection between sleep quality and academic performance ($p = 0.05$).

Conclusion: A substantial proportion of medical students experienced poor sleep quality. While sleep quality did not significantly impact the academic performance of most students, a noteworthy association was observed among final-year students.

Keywords: Sleep quality, Medical students, Academic performance

¹ FMH college of Medicine and Dentistry, Shadman, Lahore

Correspondence:

Seema Hasnain
drseemahasnain@gmail.com

Introduction

Adequate functioning of the human body needs sound sleep. A person's ability to make decisions, remember things, pay attention, as well as think creatively are all dependent on the amount of sound sleep they are managing to get on a daily basis. (1) Healthy adults need between 7 and 9 hours of sleep per night (2). Attention and concentration difficulties are associated with poor sleep pattern among students (3). Developing and developed countries have reported upsurge for poor sleep quality (4). Medical students are more prone to poor sleep as high levels of stress, hectic workload and evening/night duties augment the possibility of poor sleep quality among them which is confirmed by a Saudi Arabia study reporting an increased frequency of stress and poor sleep quality (76%) among the medical students (5).

A study conducted in Lahore reported that sleep quality was poor in 64.7% among first year and final year medical students (6). Whereas a

study conducted in Iran, the frequency of poor sleep quality was 51.3% and no significant association reported in relation to age and gender with poor sleep quality (7). A study of Karachi reported that 64.24% medical students had poor sleep quality with a mean GPA substantially lower than excellent sleepers' ($p < 0.000$). (8) A study of Kerala indicated that the frequency of poor sleep quality was high in younger age groups (17-19 years), male students, first year MBBS students, urban origin and day scholars. However significant statistical relationship was identified with year of MBBS and place of origin ($p < 0.01$ for each) (9).

A study of Peshawar stated that poor sleep quality was 69.3% and academic performance of these students was much lower than good sleepers ($P\text{-Value} = 0.002$) (10) The Ghana study depicted a statistically significant association between sleep quality and academic performance (11). Sudan study narrated that 82.5% of medical students had poor sleep along with statistically significant association with poor academic performance (12).

Same results regarding academic performance was also observed among Yemini medical students where 65% of the students mentioned that disturbed sleep was the main reason for their poor academic performance and males had more poor sleep quality than females (13).

The objectives of this study are to determine the pattern of sleep quality, its determinants and effect on the academic performance of medical students in a private medical college, Lahore.

Methodology

It was a descriptive cross-sectional study conducted on the medical students of FMH College of Medicine and Dentistry. The duration of study was from June- December 2021. After approval from the Institutional review Board, the data was collected on a pretested self-administered questionnaire by all the medical students of 2nd to final year present on the day of collection of data after having verbal informed consent. The dependent variables were pattern of sleep quality and academic performance, and non-dependent variables were age, gender, academic year, urban/rural, day scholar/hostel resident, type of family and number of hours spent on smartphone/ social media. The questionnaire had two sections. The first section related to sociodemographic profile and section 2 consisted of a validated Pittsburgh Sleep Quality Index (PSQI) questionnaire. (14) Collection of data was done by Batch A of fourth year medical students' session 2021.

Data was entered and analyzed by using SPSS version 20. For dependent and independent variables, frequency distribution tables were generated. Chi-square test was applied to find out any statistically significant effect of sociodemographic factors on sleep quality and also impact of sleep quality on the academic performance of the medical students. The same test was used for assessing the relationship of seven components of PSQI with different study years. Value of $p \leq 0.05$ was taken as statistically significant. Sleep quality is considered poor if PSQI score is 5 or greater whereas good sleep quality means if PSQI score is 0-4. Academic performance in annual examinations conducted by the University of Health Sciences was considered. Regarding academic score grade, it was divided into following categories: Excellent: > 80%, Good: 61-80%, Average: 51-60% and Poor: <50%.

Results

Out of 473 students, 275 (58.1%) belonged to the age group 22-24 years with mean age of 22.48 ± 1.73 years and 288 (60.9%) were females. The number of students from second year was 87 (18.4%) and number of fourth year students was 148(31.3%). Regarding area of origin 413(87.3%) respondents belonged to urban areas and more than half were day scholars (52.9%). Three hundred and ninety three (83.1%) students had a nuclear family. Usage of mobile/internet for more than 4 hours was admitted by 405(85.6%) students. Out of 473 students, only 103 (21.8%) had good sleep. In relation to the academic year, 87 (87%) students of second year had poor sleep. Age and gender had reported no significant statistical association with quality of sleep (p -value=0.076 and p -value=0.078 respectively). Similarly, there is no significant statistical association between sleep quality and type of family (p -value=0.86) (Table No.3). No significant association was observed between academic performance and quality of sleep except among the final

medical students with p -value=0.05 (Table No.1).

Components of Pittsburgh Sleep Quality Index (PSQI) during last one month When asked about the **subjective sleep quality**, 43 (49.4%) students of first year and 90 (60.8%) students of fourth year regarded their sleep quality as fairly good but no statistical significant association was observed (p -value=0.327). Variations also observed regarding **sleep duration** among the medical students. Out of 148 medical students of fourth year 56(37.8%) and 40 students of final year out of 138 students had sleep duration of 5-6 hours respectively thus depicting significant statistical association (p -value=0.017). When asked about the **Use of medicines for sleep**, one hundred and forty students (94.6%) of fourth year and 88 (88%) of third year had not used any sleep medication during the past month prior to data collection reporting statistically significant association (p -value=<0.000). About 45 (51.7%) of first year students and 73 (49.3%) of third year students had reported daytime dysfunction thus stating a statistically significant association with sleep quality (p -value=0.002) (Table No. 2). Only final year undergraduate students had revealed significant association of sleep quality on academic performance (Figure No.1).

Table 1: Association of socio-demographics, use of mobile phones with Global PSQI score

Age categories in years	Global PSQI		Total	Chi-square & P-value
	Good sleep 103 (21.8%)	Poor sleep 370 (78.2%)		
19-21	42(27.4%)	111(72.5%)	153(32.3%)	5.17 & 0.076
22-24	50(18.2%)	225(81.8%)	275 (58.1%)	
>25	11(24.5%)	34(75.5%)	45(9.5%)	
Gender versus Global PSQI				
Male	48(26%)	137(74%)	185(39.1%)	3.102 & 0.078
Female	55(19.1%)	233(80.9%)	288(60.9%)	
	103	(370)	473	
Academic year versus Global PSQI				
Second year	26(29.9%)	61(70.1%)	87(18.4%)	6.06 & 0.109
Third year	15 (15%)	85(85%)	100(21.1%)	
Fourth year	32(21.63%)	116(78.4%)	148(31.3%)	
Final year	30(21.7%)	108(78.3%)	138(29.2%)	
Residence versus Global PSQI				
Urban	91(22.1%)	322(77.9%)	413(87.3%)	0.127 & 0.721
Rural	12(20%)	48(80%)	60(12.7%)	
Place of stay Vs Global PSQI score				
Day scholar	52(20.8%)	198(79.2%)	250(52.9%)	0.296 & 0.589
Hostelite	51(22.9%)	172(77.1%)	223(47.1%)	
Type of family Vs Global PSQI score				
Nuclear	85(21.6%)	308(78.4%)	393(83.1%)	0.03 & 0.863
Joint	18(22.5%)	62(77.5%)	80(16.9%)	
Use of mobile , computer, internet vs Global PSQI score				
Yes	90(22.2%)	315(77.8%)	405(85.6%)	0.329 & 0.566
No	13(19.1%)	55(80.9%)	68(14.4%)	

Table 2: Scores of various components of PSQI among medical students' year wise

Components	2 nd year	3 rd year	4 th year	Final year	Chi-square & p-value
Component 1: Subjective sleep quality score					
0 (Very good)	24(27.6%)	23(23%)	30(20.3%)	33(23.9%)	10.286 & p=0.327
1 (Fairly good)	43(49.4%)	48(48%)	90(60.8%)	69(50%)	
2 (Fairly bad)	15(17.2%)	23(23%)	25(16.9%)	25(18.1%)	
3 Very bad	5 (5.7%)	6 (6%)	3(2.0%)	11(8.0%)	
Component 2: Sleep latency					
0(≤15 min)	17(19.5%)	21(21%)	22(14.9%)	27(19.6%)	9.947 & p=0.355
1(15-30 min)	36(41.4%)	33(33%)	53(35.8%)	60(43.5%)	
2 (32-60 min)	23(26.4%)	28 (28%)	55(37.2%)	34(24.6%)	
3 (> 60 min)	11(12.6%)	18(18%)	18(12.2%)	17(12.3%)	
Component 3: Sleep Duration					
0 (> 7 hours)	23 (26.4%)	10(10%)	22(14.9%)	22(15.9%)	20.088 & p=0.017
1 (6-7 hours)	21(24.1%)	29(29%)	42(28.4%)	37(26.8%)	
2 (5-6 hours)	23(26.4%)	25(25%)	56(37.8%)	40(29%)	
3 < 6 hours	20(23%)	36(36%)	28(18.9%)	39(28.3%)	
Component 4: Habitual Sleep Efficiency					
0 (>85%)	70(80.5%)	81(81%)	127(85.8%)	107(77.5%)	8.082 & p=0.526
1 (75-84%)	12(13.8%)	17(17%)	17(11.5%)	28(20.3%)	
2 (65-74%)	4(4.6%)	1(1%)	3(2%)	2(1.4%)	
3 < 65%)	1(1.1%)	1(1%)	1(0.7%)	1(0.7%)	
Component 5: Sleep disturbances					
0 (Not during the past month)	8(9.2%)	4(4%)	4(2.7%)	11(8.0%)	10.275 & p=0.329
1(<once a week)	59(67.8%)	62(62%)	100(67.6%)	86(62.3%)	
2(Once or twice a week)	17(19.5%)	31(31%)	42(28.4%)	38(27.5%)	
3(Three or more times a week)	3 (3.4%)	3(3%)	2(1.4%)	3(3.3%)	
Component 6: Use of sleep medication					
0 (Not during the past month)	75(86.2%)	88(88%)	140(94.6%)	105(76.1%)	30.601 & p<0.0001
1(Less than once a week)	9(10.3%)	7(7%)	6(4.1%)	24(17.4%)	
2 (Once or twice a week)	3(3.4%)	2(2%)	1(0.7%)	9(6.5%)	
3(Three or more times a week)	00	3(3%)	1(0.7%)	00	
Component 7: Daytime Dysfunction					
0 (Never)	20(23%)	15(15%)	29(19.6%)	50(36.2%)	26.519 & p=0.002
1(Once or twice)	45(51.7%)	46(46%)	73(49.3%)	61(44.2%)	
2 (Once or twice each week)	16(18.4%)	22(22%)	34(23%)	17((12.3%)	
3(Thrice or more each week)	6(6.9%)	17(17%)	12(8.1%)	10(7.2%)	

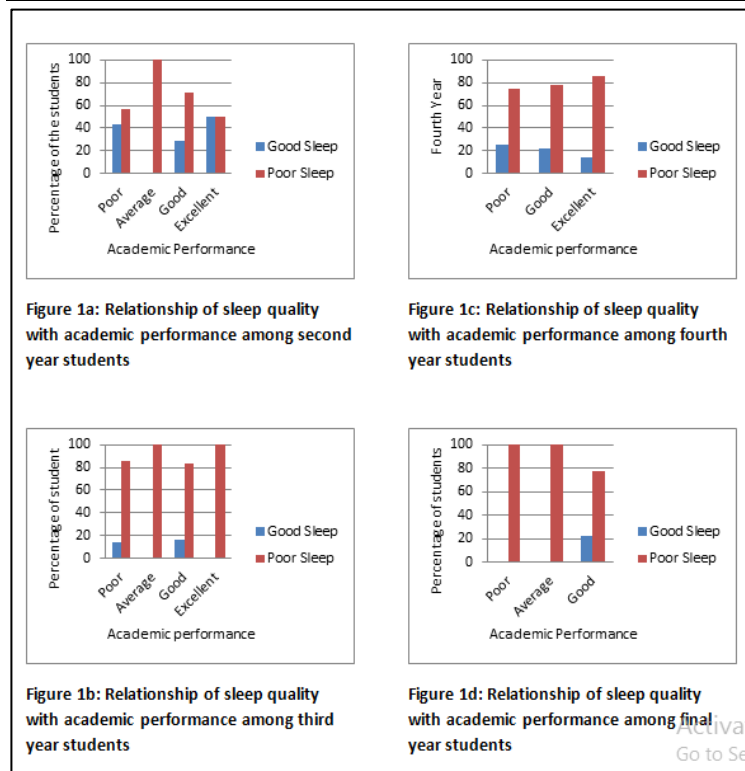


Figure 1: Relationship between sleep quality and academic performance

Discussion

This study was conducted among the medical students of FMH College of Medicine and Dentistry to determine the sleep pattern, its determinants and impact of sleep quality on academic performance. This study reported that 78.2% had poor sleep quality. Whereas a study of India reported that 72.7% medical students were poor sleepers which is consistent with our study (15) In Yemen 68% of the students displayed poor sleep quality (11) and a study of Karachi revealed that 39.5% were poor sleepers (16) The wide variation regarding sleep quality among medical students in various countries depends upon the semester system/annual examination system, sampling technique, personality traits of the students, different teaching methodology and also their lifestyle related to use of electronic devices like mobile phones and internet. About subjective sleep quality, 54.8% regarded it as fairly good and only 17.5% regarded them as fairly bad. Only 8.9% students had sleep latency of more than 60 minutes and 40.4% of about 16-30 minutes. About 30.4% reported sleeping 5-6 hours per night. Only 13.7% had used sleep medication during the past month but statistically significant association was depicted for sleep duration (p-value=0.17), use of sleep medication (p-value=0.0001) & daytime dysfunction (p-value=0.002) with the academic year of the students. A study of Brazil revealed that students of first year & 2nd year had worse subjective sleep quality (p-value=0.0001) and greater daytime dysfunction (p-value 0.0001) as compared to 3rd, 4th, 5th & 6th year. A statistically significant association was observed for subjective sleep quality and daytime dysfunction with the academic year (p-value=0.000 for both) (17). Whereas study of Ethiopia among the medical students reported 62% had poor sleep quality, 27.1% had sleep latency of 16-30 minutes and only 11.3% slept more than 7 hours per night. About 23.6% of students reported that their subjective experience of sleep quality was very bad. Only 8.5% undergraduates took medicines for sleep in three or more times a week (18). The reason for discrepancy related to the components of sleep quality varies from country to country depending upon the sleeping habits, timing of data collection in relation to examination, study schedule and use of electronic devices.

In our study, no statistically significant relationship was observed for age and quality of sleep (p-value=0.076). Contrary to this, a study of India (8) reported that students of 20-24 years had poor sleep quality as compared to those falling in the age group of 18-19 years (p-value=0.040). In the current study, there is no statistically significant association between gender versus sleep quality which is consistent to a study of Pakistan reporting no statistical relationship between quality of sleep and gender (p-value= 0.625) (19). However statistically significant association between gender and PSQI was reported by Yemen study (p-value=0.001) (11) and Egypt study ((0.001) (20). In study of Nepal, poor sleep quality is more prevalent in females (48.2%) as compared to male students (39.8%) (21). The reason may be that females are more prone to stress depending upon type of personality and possibly quality of sleep is determined by the gender-based differences in the biology of sleep.

In the current study, no significant relationship

was obtained regarding academic year and sleep quality (p-value=0.109). However, in a study in Egypt (17), higher scores of PSQI were reported among third year students whereas the lowest mean of scores were found in fourth year students. Same results are obtained from another study conducted in Lahore (p-value=0.025) (16). The reason may be that there is a shift of the students from the preclinical side in third year to clinical side and they have to perform evening duties during their clinical roster. Similarly urban or rural residence and staying in a hostel or at home did not state any significant relationship with sleep quality in this study, however studies in Karachi (13), Egypt (17), Lahore (16) and Kerala (8) depicted significant association with place of origin (p-value<0.05). Contrary to this, a study in Peshawar reported that medical students living in hostels had statistically significant association with poor sleep quality as compared to the day scholars (10).

No significant relationship was observed among the medical students who used mobile, computer and internet for more than four hours with the sleep quality (p-value=0.566). The same result is corroborated with a study of China (22). However study of Ethiopia has depicted that poor sleep quality had significant relationship among those students who used the electronic device for more than 2 hours (p-value=<0.001) (23).

Regarding overall academic performance of all years, this study did not show a significant relationship with sleep quality except for the final year (p-value=0.05). The result is comparable to our finding by a study in Lahore (p-value=0.47) (16). But studies conducted in Slovenia (24) (p-value=0.006), Rabat (25) (0.04) and in Peshawar (0.002) stated a significant association of sleep quality with academic performance (19). The reason for this contradictory result may be the difference in the examination system that is either a modular system or an annual system and personality traits of the students.

Conclusion

Prevalence of poor sleep quality was very high in the medical students especially among the clinical year students as compared to the preclinical students. Sociodemographic factors and use of mobile, internet had no significant relationship with sleep quality. Statistically significant association of sleep duration, use of medication and daytime dysfunction was observed in relation to year of study. There was a non-significant relationship between marks obtained by the students in annual examination and sleep quality

Limitations of study:

The findings of this study were based upon responses collected from students of only FMH College of Medicine and Dentistry Lahore. Therefore, the results cannot be generalized to all medical colleges in the country.

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Conflict of interest:

None to declare.

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None to disclose.

Ethical approval:

Ethical approval for the study was obtained from the Institutional Review Board of the FMH College of Medicine and Dentistry, Lahore, Pakistan, on June 14, 2022 vide Letter No. FMH - 10/5/2022- IRB-1050

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