ORIGINAL ARTICLE

Sleep Quality and Psychological Distress Among Undergraduate Students at a Private Medical and Dental College of Islamabad: A Cross-Sectional Study

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ABSTRACT

Objective: To find the relationship between sleep quality and psychological distress among undergraduate medical college students; to investigate the influence of demographic variables such as age, gender, year of study, residence, BMI, screen time, exercise, smoking status, and hostel/day scholar status on sleep quality and psychological distress; and to identify which component of psychological distress (anxiety, depression, or stress) shows the strongest correlation with poor sleep quality.

Study Design: Cross-sectional study.

Place and Duration of Study: The study was conducted at the Department of Community Medicine, HBS Medical and Dental College, Islamabad, Pakistan from August 2024 to July 2025.

Methods: A total of 320 undergraduate medical students were enrolled. A stratified random sampling technique was applied. Validated scales were used to assess sleep quality and psychological distress. Data were collected using a structured proforma and analyzed using SPSS version 25.0.

Results: Among 320 undergraduate medical students, 55.0% were females, and the mean age was 21.37 ± 1.546 years. The correlation between sleep quality and demographic variables was significant for BMI, exercise, and screen time. Sleep quality also showed a significant association with psychological distress components, including depression, anxiety, and stress. Multiple linear regression indicated that, among demographic factors, age, exercise, and screen time, and among psychological variables, depression, anxiety, and stress were significant predictors of sleep quality.

Conclusion: The study concluded that poor sleep quality was prevalent among undergraduate medical students and was significantly correlated with psychological distress. Depression, anxiety, and stress were found to be important contributing factors influencing sleep quality.

Keywords: *Medical College, Psychological Distress, Sleep Quality, Undergraduate Student*.

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Introduction

Sleep is a human physiological need and is necessary for maintaining physical and mental health.[1] Medical college students who experience poor sleep quality face several physiological as well as psychological issues when compared to the students who have good quality of sleep.[2,3] Sleep problem in medical students is found between 19 and 90 percent globally.[4] National Sleep Foundation offers evidence-based recommendations signifying that adults should have 7 to 9 hours of sleep every night. Deviance from this recommended sleep period, whether through deficit (<7 hrs) or excess (>9 hrs), is linked to a group of harmful effects, including psychological distress.[5]

Psychological distress is one of the uncomfortable emotional states that is experienced by a person due to a specific demand or stressor that causes harm, either permanent or temporary, to an individual. It is

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also defined as an emotional distress related to symptoms of stress, depression, and anxiety.[6] Worldwide, mental health in undergraduate medical college students is considered a significant public health issue.[7] Among undergraduate medical college students, prevalence of stress, depression & anxiety is increasingly identified. The rates of stress, depression, and anxiety were 40.4%, 52.3% and 60.8% respectively.[8] Such mental health problems can worsen the sleep issues, making a vicious cycle.[9]

On entering higher education, medical students typically experience important changes in their lifestyles and daily routines while concurrently facing challenges, for example, managing increasing academic demands, making career decisions, and relocating for educational and professional opportunities. Along with academic pressure, medical students often face social pressure and financial issues. Furthermore, many medical students make efforts to sustain their healthy diet, keep themselves busy in physical activity on a regular basis, and maintain constant sleep habits caused by changing workloads as well as social commitments. Particularly, the medical students experience unique challenges caused by the highly challenging and rigorous nature of their studies. The medical students must engross immense quantities of the appropriate medical knowledge during a short time, often causing extreme study periods, academic engagement for long periods, and disturbed patterns of sleep. Also, they experience clinical rotations in which these students balance the academic learning along with practical work with the patients, undergo extended working hours and manage the emotionally distressful circumstances, including the exposure to agony and death situations. Such factors could lead to a high incidence of poor sleep quality as well as mental health issues among undergraduate medical college students.[10-12]

Among medical college students, psychological distress has a deleterious impact on their academic as well as personal lives, for example, increased rates of drop-out from the medical college, poor academic performance, substance abuse, poor sleep, loneliness, broken relationships, and suicide.[6] Investigating the poor quality of sleep and psychological distress among medical college students could facilitate the early identification of potential mental health problems, enabling timely and appropriate intervention Medical students are consistently exposed to high levels of academic pressure.[13] Long study hours and disrupted routines have significant impact on their sleep quality and mental health. Poor sleep is not only common in this group but also strongly linked to enhanced symptoms of DAS. These mental health challenges often remain unrecognized and untreated during the critical formative years of their professional training, potentially impacting both their academic performance and future clinical competence. Therefore, it is pertinent to conduct a study to assess the sleep quality & psychological distress in undergraduate medical college students.

International studies have established a relationship between poor sleep quality and psychological distress among university populations. This study addresses the critical gap by concurrently assessing both variables using validated measures within an undergraduate medical student population.

Despite being at high risk, sleep and psychological health remain neglected dimensions in undergraduate medical education in Pakistan. Early identification of these issues is essential, as impaired sleep and psychological distress can compromise learning, clinical performance and long-term well-being. The results of this study will help in generating reliable evidence to inform the institutional support system and promote student wellness.

Methods

The study was conducted at the Department of Community Medicine, HBS Medical and Dental College, Islamabad from August 2024 to July 2025 after taking permission from the Intuitional Review Board and Ethical Committee of the college vide letter no: Appl#HBS/IRB-Sub/26/25, dated 18th July 2024. The study included 320 undergraduate medical students. It was calculated by using 400 population size, a 95% confidence level, 50% anticipated frequency, and 5% absolute precision.[9] When the sample was calculated, it was not in whole number (N=317), it was rounded up to following higher whole number (N=320).

Sampling Technique: A Stratified random sampling technique was used.

Sample Size for Frequency in a Population

Population size (for finite population correction factor or fpc)(N): 400
Hypothesized % frequency of outcome factor in the population (p): 50%+/-5
Confidence limits as % of 100(absolute +/- %)(d): 5%
Design effect (for cluster surveys-DEFF): 1

Sample Size(*n*) for Various Confidence Levels

Confidence Level (%)	Sample Size
95%	197
80%	117
90%	162
97%	217
99%	250
99.9%	293
99.99%	317

Equation

Sample size $N = [DEFF*Np(1-p)]/ [(d^2/Z^2_{1-\alpha/2}*(N-1)+p*(1-p)]$

Undergraduate medical students studying in HBS Medical and Dental College, Islamabad all genders, who provided informed consent were included in the study.

Students with chronic mental disorders that affected sleep, unwilling to participate, and taking medications that significantly alter sleep were excluded from the study.

After getting approval from the Institutional Review Board of HBS Medical and Dental College Islamabad, a proforma was made by researcher & finalized after pre-testing. The undergraduate medical students of HBS Medical and Dental College, Islamabad were assessed by researcher himself and the results were recorded on proforma.

After obtaining informed consent and ensuring voluntary participation with the right to withdraw at any time with no consequence, students were asked to complete the proforma. Confidentiality was maintained by using anonymous IDs and secure data storage. The proforma comprised students' information, namely age, gender, study year, residence, current residence status, body mass index (BMI), smoking, exercise, screen time, sleep quality, and psychological distress. T DASS-21 is a validated scales that was utilized to assess sleep quality and psychological distress.

a self-reported tool for the assessment of the quality of sleep was used. The quality of sleepDASS-21 is one of the validated tools to evaluate psychological distress among medical students. DASS-21 is a measure of DAS. The respondents' experience over the last week was assessed on a 4-point severity/frequency scale. For each time, the total DASS-21 score was categorized as per the DASS manual (normal, mild, moderate, severe, and extremely severe). For each subscale the recommended cutoff points are as follows: Depression [normal (0-9), mild (10-13), moderate (14-20), severe (21-27), and extremely severe (28+)], Anxiety [normal (0-7), mild (8-9), moderate (10-14), severe (15-19), and extremely severe (20+)], Stress [normal (0-14), mild (15-18), moderate (19-25), severe (26-33) and extremely severe (34+)].

The collected data were entered into the computer software SPSS (Statistical Package for Social Sciences) version 25.0. The data was statistically analyzed with the same software. For quantitative variables such as age, DASS-21 score, mean±SD were calculated, and for qualitative variables, i.e., gender, year of study, residence, current residence status, smoking, frequency, and percentages were calculated. Data was presented in tables and graphs for both quantitative and qualitative variables. The primary analysis assessed the association between sleep quality scores and DASS21 scores using the Pearson correlation coefficient. To account for potential confounding variables such as age, gender, and year of study multiple linear regression was used.

Results

Among 320 undergraduate medical students, 176 (55.0%) were females, mean age was 21.37±1.546 years, 77 (24.1%) were in second year, 215 (67.5%) were day scholars, 296 (92.5%) were non-smokers, 221 (69.1%) had normal BMI (18.5 to 24.9), 126 (39.4%) were light active and 111 (34.7%) had moderate screen time (2 to 4 hours). Among these students, the sleep quality mean score was 6.68±3.449. The psychological distress (DASS-21) mean score for depression was 10.63±7.467, for anxiety was 10.59±7.941 and for stress was 15.45±8.001.

A total of 320 students participated, including 45.0% males and 55.0% females, with a mean age of 21.37 ± 1.546 years. Most students (69.7%) were older than 20 years. (Figure.1).

By academic year, the largest group was second-year students (24.1%). Day scholars made up 67.2%, while 32.8% were hostel residents. 92.5% were non-smokers.

Based on BMI, 69.1% had normal weight, 14.4% were underweight, 15.9% overweight, and 0.6% obese. 39.4% reported light activity, while 36.6% were sedentary. Screen time was high or very high in 59.1% of students.

Poor sleep quality was reported by 68.4% (mean PSQI: 6.68 ± 3.449). For psychological distress, moderate to severe levels were found in 34.7% for depression, 54.7% for anxiety, and 33.4% for stress, with mean scores of 10.63 ± 7.467, 10.59 ± 7.941, and 15.45 ± 8.001, respectively.

Normal BMI was observed in 69.1% of students, while 39.4% reported light activity, and 59.1% had high or very high screen time. Poor sleep quality was found in 68.4% (mean 6.68 ± 3.449).

Moderate to severe depression affected 34.7% (mean 10.63 ± 7.467), anxiety 54.7% (mean 10.59 ± 7.941), and stress 33.4% (mean 15.45 ± 8.001).

The majority of students fell within the normal (42.2%) and mild (24.4%) stress categories, while 18.4% experienced moderate stress, 14.1% reported severe stress, and 0.9% were in the extremely severe category. These findings indicate that while most students had low to mild stress, a considerable proportion experienced moderate to severe levels of psychological stress.

Table 1 compared the correlation between sleep quality and psychological distress (DASS-21); among 320 participants. The findings indicate that a majority of respondents (68.4%) experienced inadequate sleep quality, while only 31.6% reported good sleep quality. Across all three dimensions of psychological distress—depression, anxiety, and stress—those with poor sleep quality showed markedly higher levels of symptoms compared to those with good sleep. Specifically, a moderate

Table 1: Correlation between sleep quality and psychological distress (DASS-21)

Psychological Distress	Sleep Quality				Total		Pearson Correlation Coefficient
	Good		Poor				
	Freq.	% age	Freq.	% age	Freq.	% age	
Depression							
Normal	85	26.6	63	19.7	148	46.3	
Mild	8	2.5	53	16.5	61	19.0	
Moderate	8	2.5	81	25.3	89	27.8	*r*=0.474*
Severe	0	0.0	16	5.0	16	5.0	*P*=0.000
Extremely severe	0	0.0	6	1.9	6	1.9	
Total	101	31.6	219	68.4	320	100.0	
Anxiety							
Normal	82	25.7	36	11.2	118	36.9	
Mild	4	1.3	23	7.1	27	8.4	
Moderate	11	3.4	110	34.4	121	37.8	*r*=0.541*
Severe	2	0.6	11	3.5	13	4.1	*P*=0.000
Extremely severe	2	0.6	39	12.2	41	12.8	
Total	101	31.6	219	68.4	320	100.0	
Stress							
Normal	92	28.8	43	13.4	135	42.2	
Mild	9	2.8	69	21.6	78	24.4	
Moderate	0	0.0	59	18.4	59	18.4	*r*=0.597*
Severe	0	0.0	45	14.1	45	14.1	*P*=0.000
Extremely severe	0	0.0	3	0.9	3	0.9	
Total	101	31.6	219	68.4	320	100.0	

**Correlation is significant at the 0.01 level*

positive correlation was found between sleep quality and depression (r = 0.474, *P* < 0.001), suggesting that poorer sleep is associated with greater depressive symptoms. Similarly, a stronger positive relationship emerged between poor sleep and anxiety (r = 0.541, *P* < 0.001), and the strongest association was observed between inadequate sleep and stress levels (r = 0.597, *P* < 0.001). These results collectively indicate that as sleep quality deteriorates, psychological distress significantly increases across all domains, highlighting the close interconnection between sleep and mental well-being.

Table 2: Multiple linear regression of sleep quality with demographic variables and psychological distress

	B**	Standard Error	Beta***	t statistic	Significance
Demographic variables					
Gender	-.031	.227	-.005	-.137	.891
Age	-.333	.118	-.149	-2.817	.005*
Academic year	.240	.137	.094	1.749	.081
Residence	.290	.247	.040	1.176	.241
Smoking	-.457	.423	-.035	-1.081	.281
BMI	.164	.199	.027	.825	.410
Exercise	-.285	.129	-.073	-2.214	.028*
Screen time	.321	.129	.084	2.497	.013*
Psychological distress					
Depression	.117	.020	.253	5.727	.000*
Anxiety	.032	.016	.073	1.945	.053*
Stress	.238	.019	.552	12.650	.000*

**P-value of 0.05 is considered statistically significant*
***Standardized Beta Coefficient / Standardized Regression Coefficient*
****Unstandardized Regression Coefficient*

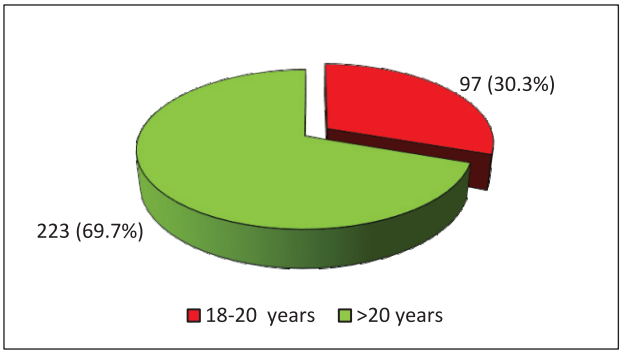

Fig.1: Age of study participants (n, %)

Multiple linear regression of sleep quality with demographic variables and psychological distress was assessed. Results showed that in demographic variables, age, exercise, and screen time while in psychological distress, depression, anxiety and stress were statistically significant predictors of sleep quality (Table 2). The multiple linear regression model examined the combined effect of demographic and psychological variables on sleep quality. The results revealed that stress, depression, screen time, exercise, and age were significant predictors of sleep quality (*P* < 0.05). Stress emerged as the strongest predictor (β = 0.552, *P* < 0.001), followed by depression (β = 0.253, *P* < 0.001). Increased screen time and higher psychological distress were associated with poorer sleep, whereas greater age and regular exercise were associated with better sleep quality. Other demographic factors, including gender, BMI, smoking, and residence, did not show significant associations. The model thus highlights the substantial influence of psychological distress and lifestyle factors on participants' sleep quality.

Discussion

Sleep is a human physiological need and is necessary for maintaining physical and mental health. The present study was carried out to assess the correlation between sleep quality and psychological distress among undergraduate medical college students in Islamabad. To obtain adequate results, 320 medical students were included in the study, and it was found that more than half (55.0%) of the students were females, while 45.0% were male students. But the results of a study undertaken by Verma P et al. exhibited a different scenario, where more than half (52.5%) of students were males and 47.5% were females.[9]

As far as age and academic year of the undergraduate medical college students are concerned, the study indicated that the majority of the students were more than 20 years old and the mean age was 21.37±1.546 years. The findings of a study conducted by Anjum and associates (2024) are comparable with our study, which also confirmed that the mean age of medical students was 21.84±1.46 years.[12] The results of our study indicated that most of the respondents were students of the second year (24.1%), followed by the fourth year (23.1%), the fifth year (20.2%), the third year (18.7%), and the first year (14.1%). In their study, Paudel and collaborators (2022) reported that most of the participants were students of the second year (22.6%), followed by the fifth year (21.7%), the first year (19.8%), the fourth year (19.3%), and the third year (16.5%).[14] The results of our study further highlighted that the majority of the medical students (67.2%) were day scholars and only 32.8% were living in hostels. But Tahir M et al. confirmed in their study that most medical students (68.7%) lived in hostels, while only 31.3% were day scholars.[2]

Smoking is an ill habit that exacerbates the health of people, but it is worth mentioning here that the significant majority (92.5%) of medical students were non-smokers and only 7.5% were smokers. Similar results were reported by a study done by Al-Haddad and teammates (2024), who also noted that 92.4% medical students were non-smokers and only 7.4% were smokers.[11]

The significant role of exercise cannot be overlooked as it reduces stress and improves sleep quality. It was found during the study that 36.6% students had a sedentary lifestyle, while 39.4%, 18.1% and 5.9% students were light active, moderate, and highly active, respectively. But a study carried out by Valladares-Garrido MJ et al. reported that 36.6%, 8.9% and 54.5% medical students were light active, moderate active and high active, respectively.[1] In our study, most of the medical students (69.1%) had normal weight, while 14.4%, 15.9% and 0.6% students were underweight, overweight, and obese, respectively.

But a study undertaken by Keyvanfar A et al. reported that 80.3% the medical students had poor sleep quality and the mean score was 8.11 ± 2.99.[15] Similar scenario was reported by a study conducted by Aldabbour B et al and colleagues (2025) that 77.9% students had sleep poor quality as the score was >5.[16] Another survey performed by Tahir M et al. highlighted that 71.4% medical students had sleep poor quality and the mean score was 6.47 ± 3.023.[2]

During the study, the depression, anxiety, and stress scale (DASS-21) was also assessed among medical students to know psychological distress. Study revealed that 46.3% medical students had no depression (normal: 0-9) while 19.0% had mild depression (10-13), 27.8% had moderate depression (14-20), 5.0% had severe depression (21-27), 1.9% had extremely severe depression (28+) and the mean depression score was 10.63±7.467 (mild depression). Likewise, 36.9% medical students had no anxiety (normal: 0-7) while 8.4% had mild anxiety (8-9), 37.8% had moderate anxiety (10-14), 4.1% had severe anxiety (15-19), 12.8% had extremely severe anxiety (20+) and the mean anxiety score was 10.59±7.941 (moderate anxiety). Study further disclosed that 42.2% medical students had no stress (normal: 0-14) while 24.4% had mild stress (15-18), 18.4% had moderate stress (19-25), 14.1% had severe stress (26-33), 0.9% had extremely severe stress (34+) and the mean stress score was 15.45±8.001 (mild stress). A study done by Verma P et al. reported that 73.02% medical students had no depression (normal), while 7.89% had mild depression, 9.21% had moderate depression, 7.89% had severe depression, 1.95% had extremely severe depression, and the mean depression score was 10.81±11.04 (mild depression).[9] Likewise, 36.18% medical students had no anxiety, while 18.42% had mild anxiety, 23.02% had moderate anxiety, 9.86% had severe anxiety, 12.5% had extremely severe anxiety, and the mean anxiety score was 8.95±8.64 (mild anxiety). The results of their study further indicated that 68.42% medical students had no stress, while 12.5% had mild stress, 11.18% had moderate stress, 7.0% had severe stress, 6.57% medical students had extremely severe stress, and the mean stress score was 10.44±9.87 (no stress).[9] Another study carried out by Aldabbour B and colleagues (2025) demonstrated that 30.9% medical students had no depression (normal) while 13.3% had mild depression, 33.1% had moderate

depression, 10.2% had severe depression, 12.4% had extremely severe depression, and the mean depression score was 15.19±9.10 (moderate depression). Similarly, 22.7% medical students had no anxiety, while 7.5% had mild anxiety, 25.7% had moderate anxiety, 15.7% had severe anxiety, 28.5% had extremely severe anxiety, and the mean anxiety score was 14.16±8.67 (moderate anxiety). They further reported that 34.8% medical students had no stress, while 21.0% had mild stress, 21.8% had moderate stress, 16.9% had severe stress, 5.5% had extremely severe stress, and the mean stress score was 18.33±8.58 (mild stress).[16]

The study also assessed the correlation between sleep quality and demographic variables; a significant correlation was found regarding BMI, exercise, and screen time, while an insignificant correlation was found regarding gender, age, academic year, residence, and smoking. A study done by Alhusseini NK et al. reported a significant correlation regarding academic year, while an insignificant correlation regarding age, gender, marital status, and employment status.[17] The results of a study carried out by Elnoamanya S et al. showed a significant correlation regarding gender, while an insignificant correlation regarding academic year.[18] Another study performed by Laishram J et al. highlighted a significant correlation regarding academic year, screentime, while an insignificant correlation regarding age, gender, and use of gadgets before sleep.[13]

When the correlation between sleep quality and psychological distress (DASS-21) was compared, a significant correlation was found regarding depression, anxiety, and stress. A study performed by Verma P et al. also showed a significant correlation regarding depression, anxiety, and stress.[9] In a study, Kharche P et al. highlighted a significant correlation between depression and anxiety.[19] Another study conducted by Purushothaman S et al. found a significant correlation regarding psychological distress.[20] Hayat SM et al. reported significant correlations between depression and sleep disturbance and between sleep disturbance and anxiety.[21] A study undertaken by Suraj A et al. reported that poor sleep quality showed significant correlations with depression and stress but not with anxiety.[22] A study done by Daud A et al. reported moderate correlation between poor sleep quality and higher levels of depression, anxiety, and stress among undergraduate medical students.[23]

During the study, multiple linear regression of sleep quality with demographic variables and psychological distress was also assessed. Results showed that in demographic variables, age, exercise, and screen time were statistically significant predictors of sleep quality, while in psychological distress, depression, anxiety, and stress were statistically significant predictors of sleep quality. A study performed by Watson A et al. indicated that gender and BMI of students who experienced depression, anxiety, and stress had an enhanced risk for being poor sleepers.[24] A study done by Vidovic S et al. also confirmed that, according to multiple linear regression, depression, anxiety, but not stress, were statistically significant predictors of sleep quality.[10]

This study has certain limitations that should be acknowledged. First, it was conducted at a single institution, which may limit the generalizability of the findings to other settings or populations. Institutional characteristics such as organizational culture, resources, or demographic composition could influence the results. Second, cross-sectional design restricts the ability to establish causal relationships between variables; it only provides a snapshot of associations at a single point in time. Longitudinal or multi-institutional studies would provide a more comprehensive understanding and stronger evidence.

Conclusion

The study assessed the correlation between sleep quality and psychological distress among undergraduate medical college students. Study concluded that sleep quality was found to be poor among undergraduate medical college students, while depression, anxiety, and stress were observed to be mild, respectively. There was a significant correlation between sleep quality with depression, anxiety, and stress.

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AAZ: Conception and design of the work, writing the original draft, proofreading, and approval for final submission

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