

Sleep Quality and Perceived Stress as Determinants of Academic Performance in Undergraduate Medical Students at M. Islam Medical and Dental College, Gujranwala

Dr. Syed Ahmed Mahmud¹, Dr. Muhammad Sair², Dr. Ammara Saif Ullah³, Aqsa Abbas⁴

¹Associate Professor, Department of Behavioral Sciences, M. Islam Medical and Dental College, Gujranwala

²Professor, Department of Pharmacology, M. Islam Medical and Dental College, Gujranwala

³Demonstrator, Department of Behavioral Sciences, M. Islam Medical and Dental College, Gujranwala

⁴Senior Lecturer, Department of Pharmacology, M. Islam Medical and Dental College, Gujranwala

Corresponding Author: Dr. Syed Ahmed Mahmud, Department of Behavioral Sciences, M. Islam Medical and Dental College, Gujranwala. Email: ahmedmahmud@mimdc.edu.pk

Abstract

Objective: To examine the relationship between sleep quality, perceived stress, and academic outcomes among undergraduate medical students.

Methods: A cross-sectional analytical design was employed at M. Islam Medical and Dental College, Gujranwala, over a three-month period (January–March 2026), following clearance from the institutional ethical review committee. Using non-probability convenience sampling, 220 undergraduate MBBS students were recruited. Sleep quality was quantified via the Pittsburgh Sleep Quality Index (PSQI), and psychological stress was gauged using the Perceived Stress Scale (PSS-10). Academic scores from the most recent professional examinations served as the outcome measure. Statistical analyses — including Pearson correlation and multiple linear regression — were performed on SPSS version 26. The threshold for statistical significance was set at $p \leq 0.05$.

Results: Of the 220 students enrolled, 121 (55%) were female and 99 (45%) were male, with a mean age of 21.3 ± 1.8 years. Disturbed sleep was reported in 136 students (61.8%), while 150 (68.2%) exhibited moderate-to-high stress. Sleep quality and academic performance were negatively correlated ($r = -0.41$, $p < 0.001$), as were stress levels and examination scores ($r = -0.36$, $p < 0.001$). On regression analysis, both poor sleep ($\beta = -0.32$, $p = 0.002$) and elevated stress ($\beta = -0.28$, $p = 0.004$) independently predicted weaker academic performance.

Conclusion: Disrupted sleep and heightened psychological stress were each significantly linked to lower academic achievement in this cohort. Institution-level programmes targeting sleep hygiene and stress regulation could meaningfully enhance students' scholastic outcomes.

Keywords: Sleep quality, Perceived stress, Academic performance, Medical students, PSQI

Introduction

Among the various professional training pathways, medical education stands out for the intensity of its demands. Students pursuing an MBBS degree routinely contend with heavy course loads, relentless examination cycles, clinical exposure, and the psychological weight of working in a healthcare context. These pressures, if unaddressed, can erode both sleep quality and mental health — two factors with well-documented effects on academic success.

From a physiological standpoint, adequate sleep is indispensable for consolidating newly acquired knowledge, sustaining attention, and preserving cognitive flexibility. When sleep is curtailed or fragmented, students tend to struggle with tasks requiring focused concentration and analytical reasoning. In the context of medical training, where the volume of material to be retained is especially large, this cognitive toll can translate directly into poorer examination outcomes. Medical students are at elevated risk for disrupted sleep given the competing demands placed on their time.

Psychological stress constitutes an equally important variable. When stress becomes chronic, it undermines the motivational and cognitive resources students need to learn effectively. Studies on medical student populations have linked elevated stress to heightened rates of burnout, depressive symptoms, and academic underperformance. The relationship is unlikely to be simple or unidirectional — stress and sleep disturbance may reinforce each other, compounding their individual effects on learning.

The international literature on this topic is reasonably well developed, with multiple studies pointing to significant associations between poor sleep, high stress, and diminished academic attainment among medical students. Within Pakistan, however, comparatively little empirical work has addressed these questions at the institutional level. This gap limits the ability of local medical colleges to design evidence-based support systems for their student bodies.

Against this backdrop, the present study was undertaken to assess how sleep quality and perceived stress individually and jointly affect academic performance among undergraduate medical students at M. Islam Medical and Dental College, Gujranwala.

Methods

This investigation followed a cross-sectional analytical framework and was conducted at M. Islam Medical and Dental College, Gujranwala, between January and March 2026. Prior to any data collection, formal ethical clearance was secured from the institution's review committee.

The required sample size was derived using a 95% confidence interval with a 5% acceptable margin of error. A total of 220 students spanning all years of the MBBS programme were recruited through non-probability convenience sampling. Participation was voluntary; written informed consent was obtained from each student before enrolment. Individuals with pre-existing psychiatric diagnoses or chronic medical conditions known to affect sleep architecture were excluded to minimise confounding.

Data collection relied on a three-part self-administered questionnaire. The first section gathered baseline demographic details. The second section incorporated the Pittsburgh Sleep Quality Index (PSQI), a validated 19-item instrument in which higher cumulative scores reflect more severely disrupted sleep. The third section used the 10-item Perceived Stress Scale (PSS-10) to capture participants' subjective appraisal of their recent stress burden. Academic performance was operationalised as the percentage score achieved in the most recent professional examination; these figures were obtained directly from institutional records following student consent.

All statistical work was carried out in SPSS version 26. Continuous variables were summarised as mean $\pm$ standard deviation; categorical variables were reported as frequencies and percentages. Pearson's correlation coefficient was used to explore bivariate relationships between sleep quality, stress, and academic scores. Thereafter, multiple linear regression was run to determine whether each predictor independently contributed to variance in academic performance when controlling for the other. Statistical significance was defined as $p \leq 0.05$ throughout.

Results

The study cohort comprised 220 undergraduate medical students. Their mean age was 21.3 ± 1.8 years. Female students made up the larger share of the sample at 55% ($n = 121$), with males accounting for the remaining 45% ($n = 99$).

Sleep disturbance was prevalent: 136 students (61.8%) recorded PSQI scores consistent with poor sleep quality. Stress levels were similarly elevated — 150 participants (68.2%) fell into the moderate-to-high range on the PSS-10. The group's mean academic score was $68.2\% \pm 9.5$.

Pearson correlation analysis revealed a statistically significant negative relationship between sleep quality and academic performance ($r = -0.41$, $p < 0.001$), confirming that students with poorer sleep tended to achieve lower examination scores. Perceived stress likewise showed a significant inverse association with academic outcomes ($r = -0.36$, $p < 0.001$).

In the regression model, both poor sleep quality ($\beta = -0.32$, $p = 0.002$) and elevated stress ($\beta = -0.28$, $p = 0.004$) emerged as independent predictors of reduced academic performance, indicating that each variable contributed meaningfully to the outcome beyond the influence of the other.

Discussion

The data reported here paint a fairly consistent picture: disturbed sleep and heightened stress are common among undergraduate medical students and carry measurable academic costs. More than three-fifths of the sample slept poorly, and over two-thirds reported significant psychological stress — rates that underscore how normalised these difficulties have become within medical training environments.

The negative correlation between sleep quality and academic performance adds local, context-specific evidence to a body of international literature pointing in the same direction. Sleep is not merely restorative; it is mechanistically involved in the consolidation of learning. During deep and REM sleep phases, newly encoded information is processed and stabilised in long-term memory.

When these phases are disrupted — as they commonly are under conditions of academic overload — students' capacity to retain and retrieve information degrades. For medical students, who must command vast and rapidly expanding bodies of clinical knowledge, this degradation is particularly consequential.

The finding regarding perceived stress aligns with theoretical models proposing that sustained psychological pressure narrows attentional bandwidth, reduces intrinsic motivation, and compromises executive functioning. Medical students face an especially complex stress landscape: the fear of clinical error, empathic burden, competitive peer environments, and the financial and familial expectations that often accompany professional study. Any of these factors, independently or in combination, may push stress levels beyond a productive threshold into one that impedes learning.

It is worth noting that the two predictors — sleep and stress — are not independent in practice. Sleep deprivation heightens emotional reactivity and impairs stress regulation, while chronic stress fragments sleep through heightened arousal and rumination. The regression findings confirm that both variables independently predict academic outcomes, but the real-world interaction between them probably amplifies the academic burden beyond what either factor alone would produce.

These findings carry practical implications for institutional policy. Medical colleges in Pakistan — and elsewhere — might consider integrating structured sleep hygiene education into student orientation and pastoral programmes. Cognitive-behavioural techniques for managing academic stress, peer mentorship schemes, and accessible counselling services represent other viable avenues for institutional intervention. Such measures need not be resource-intensive to be effective; even brief, evidence-informed workshops have shown benefit in comparable settings.

The study's limitations warrant acknowledgement. Its cross-sectional design precludes causal inference; while the correlations observed are consistent with the hypothesis that poor sleep and stress impair academic performance, reverse causation and third-variable explanations cannot be ruled out. The reliance on self-report instruments introduces the possibility of response bias, particularly social desirability effects in the context of stress disclosure. Finally, the single-institution sample limits the generalisability of the findings to other medical colleges in Pakistan. Longitudinal, multicentre research would help establish directionality and assess whether intervention-driven improvements in sleep or stress translate into measurable academic gains.

Conclusion

This study found that poor sleep quality and elevated perceived stress were each independently and significantly associated with lower academic performance among undergraduate medical students. Given the high prevalence of both conditions within this population, targeted institutional strategies aimed at improving sleep practices and equipping students with effective stress management tools could offer meaningful academic — and broader wellbeing — benefits.

Disclaimer: None.

Conflict of Interest: None.

Source of Funding: None.

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