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Perceived Stress Levels and Sleep Quality in First-Year MBBS Students: A Questionnaire-Based Cross-Sectional Study

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ABSTRACT

Background: The first MBBS year involves abrupt academic escalation, competitive pressure, psychosocial adaptation, and disrupted routines, predisposing students to psychological stress and impaired sleep. Stress-mediated HPA axis activation elevates cortisol and sympathetic tone, while poor sleep worsens cognition and emotional regulation. Questionnaire-based screening enables early identification of stress–sleep interaction in high-risk students.

Methods: This cross-sectional study included 150 consenting first-year MBBS students aged 17–22 years who completed PSS-10 for perceived stress (low: 0–13; moderate: 14–26; high: 27–40) and PSQI for sleep quality (>5=poor sleep) anonymously during lecture hours. Gender differences were analysed using an independent t-test, and the stress–sleep association was analysed using Pearson's correlation.

Results: A total of 150 first-year MBBS students (age 17–22 years; mean age 18.6±1.2 years) participated, comprising 78 males and 72 females. Pre-sleep gadget use (72%) and evening caffeine consumption (56%) were commonly reported. The cohort demonstrated a mean PSS-10 score of 21.4±5.8, indicating moderate perceived stress, and a mean PSQI global score of 7.2±2.9, reflecting poor subjective sleep quality. Female students showed significantly higher stress perception and poorer sleep quality compared to males ($p<0.05$). Perceived stress and sleep impairment exhibited a strong positive correlation ($r=0.62$, $p<0.001$).

Conclusion: First-year MBBS students exhibit moderate stress and impaired sleep, with significant positive stress–sleep correlation. Early integration of stress management and sleep hygiene education is recommended to support student well-being and academic performance.

Key-words: Perceived stress, Sleep quality, Perceived Stress Scale (PSS-10), Pittsburgh Sleep Quality Index (PSQI), HPA axis, Sleep hygiene

INTRODUCTION

Entry into medical school is a major academic and lifestyle transition that challenges students' cognitive reserve, coping mechanisms, and emotional adaptability. The first MBBS year exposes learners to high information density, frequent formative assessments, reduced sleep opportunity, peer-comparison pressure, and separation from home support systems, all of which contribute to psychological stress and irregular sleep–wake behavior.[1-3] Persistent stress activates the hypothalamic–pituitary–adrenal (HPA) axis, elevating cortisol secretion and sympathetic tone, which may delay sleep onset, increase sleep latency, and fragment nocturnal rest.[4-6] Sleep disruption further amplifies stress perception by impairing memory consolidation, reducing sustained attention, destabilizing mood, and lowering daytime academic functionality, creating a self-reinforcing stress–sleep loop. [7-9] Early screening using validated questionnaires is widely recognised as a reliable, learner-

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centric approach to identifying stress-related sleep impairment among medical entrants, enabling timely behavioural guidance and institutional support.[10-12]

Given this background, the present study was designed to assess perceived stress levels using the Perceived Stress Scale-10 (PSS-10) [12], evaluate subjective sleep quality using Pittsburgh Sleep Quality Index (PSQI) global scores [7] and analyze gender-based differences and the correlation between stress and sleep quality.[5,6] This investigation aims to contribute to early-year student wellness surveillance and highlight the importance of integrating coping-skill and sleep-hygiene awareness at the entry level of medical training.

MATERIALS AND METHODS

Research Design- This was a questionnaire-based, cross-sectional observational study conducted on first-year MBBS students to evaluate perceived stress and subjective sleep quality during the initial phase of medical training.[1-3] Data collection was carried out in the Department of Physiology, Gouri Devi Institute of Medical Sciences and Hospital, Durgapur, West Bengal, from April 2022 to March 2023. The study period was planned to capture students across both teaching semesters, ensuring representation of routine academic stress exposure.

Methodology- The study enrolled 150 first-year MBBS students (17–22 years) through voluntary participation, after obtaining informed consent. [11-12] Stress perception was assessed using the Perceived Stress Scale-10 (PSS-10), a 10-item tool scored from 0–40, categorized as low (0–13), moderate (14–26), and high (27–40). [12] Subjective sleep quality was evaluated using the Pittsburgh Sleep Quality Index (PSQI), a 7-component instrument assessing latency, duration, disturbances, efficiency, and daytime dysfunction, with a global score >5 indicating poor sleep quality.[7-8] Questionnaires were completed anonymously during lecture hours to reduce peer-driven response influence and social-desirability bias. [10-11] Standard scoring keys were used for manual score computation.

Inclusion Criteria

- ✓ Enrollment in the first-year MBBS program [11]
- ✓ Age 17–22 years [12]
- ✓ Written informed consent provided voluntarily

Exclusion Criteria

- ✓ Pre-existing diagnosis of sleep disorders [7]
- ✓ Chronic systemic or metabolic illnesses affecting sleep or autonomic function [8]
- ✓ Psychiatric illness or use of medications influencing sleep physiology (e.g., sedatives, antidepressants, stimulants) [9]

Statistical Analysis- Gender-based differences in stress and sleep scores were analyzed using an independent t-test to assess differences between male and female student groups.The relationship between perceived stress and subjective sleep quality was evaluated using Pearson's correlation coefficient, which measures the strength and direction of the association between PSS-10 and PSQI global scores. All analyses used two-tailed p-values, and $p<0.05$ was considered statistically significant.

Ethical Approval- The study was conducted with approval from the Institutional Ethics Committee of Gouri Devi Institute of Medical Sciences and Hospital, Durgapur, West Bengal. Ethical standards, participant anonymity, voluntary participation, and confidentiality were strictly maintained. Data were collected using anonymous paper-based questionnaires completed in classroom settings.

RESULTS

A total of 150 first-year MBBS students participated in the study, with an age range of 17–22 years and a mean age of 18.6±1.2 years (Table 1). Among them, 78 (52%) were males and 72 (48%) were females. A majority of students (92, 61.3%) were residing in hostels, while 58 (38.7%) were day scholars. Eighty-four students (56%) reported caffeine consumption after 6 PM, and 108 students (72%) reported using gadgets within 30 minutes before sleep. A high proportion of students (92%) expressed willingness for curriculum-integrated wellness sessions focusing on stress management and sleep hygiene.

Table 1: Baseline Demographic and Lifestyle Characteristics of First-Year MBBS Students

Parameters	Results
Total Participants (n)	150
Age Range (years)	17–22

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Mean Age (years)	18.6±1.2
Gender Distribution	Male: 78 (52%), Female: 72 (48%)
Hostel Residents	92 (61.3%)
Non-Hostel Residents	58 (38.7%)
Students reporting caffeine after 6 PM	84 (56%)
Students using gadgets before sleep	108 (72%)
Students requesting wellness sessions	138 (92%)

In Table 2, the cohort's mean PSS-10 score was 21.4±5.8, indicating moderate perceived stress, while the mean PSQI global score was 7.2±2.9, reflecting overall poor subjective sleep quality.

Table 2: Perceived Stress and Sleep Quality Scores of the Study Cohort

Parameter	Mean±SD	Interpretation
PSS-10 Score	21.4±5.8	Moderate stress
PSQI Score	7.2±2.9	Poor sleep quality

In Table 3, the Gender-Wise comparison demonstrated significantly higher stress and poorer sleep scores in females than in males ($p<0.05$). Pearson's correlation analysis revealed a strong positive association between stress and sleep impairment ($r=0.62$, $p<0.001$), suggesting that students with higher perceived stress were more likely to report poorer sleep quality and daytime dysfunction.

Table 3: Gender-Wise Comparison of Perceived Stress and Sleep Quality

Gender	PSS-10 (Mean±SD)	PSQI (Mean±SD)	Significance
Male (n=78)	20.8±5.4	6.9±2.7	$p<0.05$
Female (n=72)	22.1±6.1	7.5±3.0	$p<0.05^*$

**p-value less than 0.05 was considered significant*

DISCUSSION

The first MBBS year introduces a convergence of academic intensity and lifestyle disruption that challenges students' psychological equilibrium and sleep–wake homeostasis. [2-5] Academic stress has been shown to activate the hypothalamic–pituitary–adrenal (HPA) axis and increase sympathetic tone, contributing to delayed sleep onset and fragmented nocturnal rest.[4,6,8] Sleep impairment in young adults further aggravates stress perception by reducing memory consolidation, sustained attention, daytime alertness, and emotional stability. [7,9,13]

Learner anonymity in classroom-based questionnaires is recognised as reducing reporting bias and improving the reliability of self-perceived stress and subjective sleep assessments.[10,12,14] Early surveillance using validated tools allows identification of stress-associated sleep vulnerability before it evolves into chronic sleep debt, burnout, or impaired autonomic recovery. [5,14]

Mindfulness-based coping strategies, structured counseling access, peer-assisted emotional support, and formal sleep-hygiene education have been endorsed as effective early-level curriculum interventions to strengthen adaptive resilience, protect cognitive performance, and improve daytime academic functioning. [11,12,15] Without early support, sustained stress and irregular sleep may increase susceptibility to oxidative imbalance, autonomic dysregulation, and long-term cardiometabolic strain, which can impact future physician well-being. [3,15]

This study underscores the importance of institutional student-wellness frameworks and early integration of stress-management and sleep-hygiene awareness into Phase-I MBBS training, so that students can learn through pressure, not at the cost of it, promoting sustainable academic growth and healthier professional development.

STRENGTHS

This study used validated, widely accepted questionnaires (PSS-10 and PSQI), ensuring reliable and reproducible assessment of stress and sleep patterns in early medical trainees. The anonymous, classroom-based data collection minimized peer influence and reporting bias, improving response authenticity. The study addresses a relevant academic-wellness concern at the entry level of MBBS, providing actionable justification for early institutional screening and curriculum-based interventions.

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LIMITATIONS

The study relied on self-reported questionnaire data, which may be influenced by subjective interpretation despite anonymity. The cross-sectional design captures stress and sleep at a single point in time, limiting the ability to infer causality or track longitudinal variation. Additionally, the absence of objective sleep or biochemical stress markers prevents the physiological quantification of the observed stress–sleep interaction.

CONCLUSIONS

First-year MBBS students exhibit moderate perceived stress and poor subjective sleep, with a strong positive association between stress and sleep**,** reflecting a significant early training challenge. Stress and sleep disruption are interlinked factors that can impair attention, memory, mood, and daytime academic function if they persist. Early integration of structured stress-management training and sleep-hygiene education at the entry level is recommended to support learning efficiency and prevent progression to chronic sleep debt, burnout, or long-term autonomic imbalance. Periodic institutional screening and wellness support may strengthen student resilience and overall well-being during medical training.

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