Annals of Psychiatric Research
An official journal of Indian Psychiatric Society, Rajasthan Chapter

ORIGINAL RESEARCH ARTICLE
p-ISSN: 2455-6599
Doi: 10.70468/aopr.v03.i1.03

A Comparative Study of Sleep Quality and Its Associated Factors Across Different Years of Postgraduate Medical Training at a Tertiary Care Hospital in Rajasthan

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Abstract

Background: Sleep is a fundamental biological process essential for physical restoration, cognitive performance and emotional stability. Postgraduate medical students are vulnerable to sleep disruption owing to irregular duty hours, high academic workload, and emotional stress. This study aimed to evaluate and compare sleep quality and its associated factors across different postgraduate training years.

Method: A cross-sectional study was conducted over three months among 315 medical postgraduate students at a tertiary care hospital. Socio-demographic details were recorded, and the Pittsburgh Sleep Quality Index (PSQI) was administered. Additionally, a self-designed checklist was used to assess the factors potentially influencing sleep quality.

Results: Poor sleep quality was highly prevalent in this population. Sleep duration and latency were the most affected PSQI domains, with marked daytime dysfunction reported by the study participants. Students in the first and third years of residency demonstrated poorer sleep quality than those in the second year, suggesting a U-shaped trend in disturbance across training years. More than 80% of the participants reported working one to three night shifts per week. Work-related stress, late-night digital media use, environmental noise, and irregular duty schedules were common associated factors.

Conclusion: Poor sleep quality is widespread among postgraduate medical students, with the greatest impact observed in the first and final years of training. Institutional measures, such as regulated duty hours, promotion of healthy digital habits, sleep hygiene education, and improvement of living conditions, are warranted to enhance trainee well-being and performance.

ARTICLE INFO

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Dates:
Received: 05-07-2025
Accepted: 18-08-2025
Published: 09-10-2025

Keywords:
Sleep quality, Postgraduate medical students, Pittsburgh Sleep Quality Index, Workplace, Stress

How to Cite:
Kotia A, Tak NK, Bhaskar M. A Comparative Study of Sleep Quality and Its Associated Factors Across Different Years of Postgraduate Medical Training at a Tertiary Care Hospital in Rajasthan. Annals of Psychiatric Research. 2025;3(1): 10-14.

Introduction

Sleep is a fundamental biological process essential for physical restoration, cognitive performance, and emotional regulation. Adequate and restorative sleep supports optimal memory consolidation, decision-making, learning, and mood stability, whereas sleep disruption has been associated with impaired

memory, poor concentration, mood disturbances, and decreased overall functioning [1,2]. Sleep deficiency also has important implications for physical health, including an increased risk of cardiovascular disease, metabolic dysfunction, and immune suppression [2].

Healthcare professionals, particularly postgraduate medical trainees, represent a vulnerable population with a high prevalence of sleep disturbances. Residency is characterized by prolonged duty hours, rotating shifts, high academic demands, and emotional stress, all of which can disrupt circadian rhythms and impair sleep quantity and quality [3,4]. In India, emerging evidence has shown that 60 to 70% of resident doctors experience poor sleep quality, which adversely affects their well-being and clinical efficiency [3,4].

Sleep quality[5] in residents may be influenced by several factors, including workload, frequency of night shifts, digital device use before bedtime, environmental disturbances, and personal stressors. These determinants may vary across different years of training, as junior residents often face steep learning curves and erratic schedules, whereas senior residents may experience increased administrative responsibilities and examination-related stress [6,7].

Understanding yearly variations and associated risk factors for sleep quality is important for designing targeted interventions to improve resident wellness and prevent burnout. This study aimed to evaluate the prevalence of poor sleep quality among postgraduate medical students using the Pittsburgh Sleep Quality Index (PSQI), compare sleep quality scores across training years, and identify the behavioural and academic factors associated with poor sleep quality in a tertiary care setting.

Materials and Method

This cross-sectional, questionnaire-based study was conducted over three months at a tertiary care teaching hospital in Rajasthan, India. A total of 315 postgraduate medical students (PGs) from various clinical and para-clinical specialities were enrolled using convenience sampling. The study protocol was reviewed and approved by the Institutional Ethics Committee. This study was approved by the Institutional Ethics Committee (Ref No: No./MGMC&H/IEC/JPR/2025/4971, 20th Sept,2025). Written informed consent was obtained from all the participants. The following inclusion and exclusion criteria were applied.

Inclusion Criteria

- All postgraduate medical students (1st, 2nd, and 3rd years) currently enrolled in the institution and present during the study period were included.

Exclusion Criteria

- Students on long-term leave during the study period were excluded.
- Students diagnosed with sleep disorders prior to enrolment.

The following tools were used in the present study.

Socio-demographic Questionnaire

Information on age (in completed years), gender, year of postgraduation, speciality, and accommodation type (hostel or private) was collected.

Pittsburgh Sleep Quality Index (PSQI)

The PSQI is a validated self-report tool for assessing sleep quality over the past month.[5] It evaluates seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleeping medication, and daytime dysfunction. Scores for each component ranged from 0 to 3, yielding a global score ranging from 0 to 21. A global PSQI score >5 indicates poor sleep quality and suggests significant sleep issues warranting further evaluation or intervention.

Associated Factors Checklist

In addition to the PSQI, a self-developed checklist was designed by the investigators to capture potential factors associated with poor sleep quality among postgraduate medical students. The checklist was created based on a review of the existing literature and the authors' clinical observations. It included variables such as frequency of night shifts, work-related stress, late-night digital device use, environ-

mental disturbances in accommodation, caffeine or stimulant intake before bedtime, and irregular meal timings. Responses were recorded as categorical (yes/no) or frequency-based responses. This instrument was intended to capture the contextual and behavioral correlates of sleep quality specific to the study population and was not a validated tool.

Participants completed the socio-demographic questionnaire, PSQI, and associated factors checklist in a single sitting under supervision to ensure completeness.

Data analysis

Data were entered into Microsoft Excel and analyzed using SPSS version 16. Descriptive statistics were used for the socio-demographic characteristics. The prevalence of poor sleep quality (PSQI >5) was calculated for the entire sample and stratified by the year of training. Comparisons across years were performed using chi-square tests for all categorical variables. Statistical significance was set at $p < 0.05$.

Results

The study included 315 postgraduate students from various specialities. The age, sex distribution, year of training, and accommodation type are presented in (Table 1). The component-wise distribution of the PSQI subscales is shown in (Table 2). Sleep duration and sleep latency were the most affected domains, indicating difficulty in both achieving timely sleep onset and maintaining adequate sleep duration. Significant daytime dysfunction and frequent disturbances reflect the clinical impact of compromised sleep. A year-wise comparison of the PSQI categories is shown in (Table 3). Sleep quality was poorest among the PGY1 and PGY3 students, with the PGY2 showing relatively better scores. This pattern suggests a U-shaped trend with high levels of disturbance in the initial and final years of training.

Work-related stress, late-night use of digital devices, environmental disturbances (e.g., noisy hostel environments), and frequent night shifts were common factors associated with poor sleep. More than 80% of the participants reported 1–3 night shifts per week. The distributions of these factors are shown in (Table 4).

Table 1 : Characteristics of the study population

Parameter	Value (n)	Percentage (%)
Mean Age (in years) +/- SD	27.5 +/- 3.3	
Sex		
Male	155	49.21%
Female	160	50.79%
Year of Postgraduation		
PGY1	119	37.78%
PGY2	82	26.03%
PGY3	109	34.60%

Table 2 : Component-wise distribution of sleep quality among medical postgraduate students

PSQI Component	Affected (N)	Percentage
Subjective Sleep Quality	78 / 315	25.0%
Sleep Latency	119 / 315	38.0%
Sleep Duration	132 / 315	42.0%
Habitual Sleep Efficiency	94 / 315	30.0%
Sleep Disturbances	110 / 315	35.0%
Use of Sleeping Medication	38 / 315	12.0%
Daytime Dysfunction	104 / 315	33.0%

Discussion

This study found a high prevalence of poor sleep quality among postgraduate medical students, with notable variations across training years. Sleep duration and latency emerged as the most affected PSQI domains, consistent with earlier studies in both Indian and global contexts [3,4,6].

The observed U-shaped trend, where PGY1 and PGY3 residents reported poorer sleep quality, aligns with the literature, indicating that early-year trainees face significant schedule disruptions and steep learning demands, while final-year residents often experience increased administrative tasks, academic commitments, and examination stress [7,10]. PGY2 residents, in contrast, may have adapted to workflow demands and exhibited relatively better coping mechanisms, explaining their comparatively better scores.

Table 3 : Self-reported sleep quality across different postgraduate years of the study participants

Postgraduate Year	Fairly Bad (11–15)	Fairly Good (6–10)	Very Bad (16–21)	Very Good (0–5)	Total
PGY1	29	56	24	10	119
PGY2	19	45	8	14	86
PGY3	56	37	8	8	109

Night duties and shift work were highly prevalent, with more than 80% of the participants having 1–3 night duties per week. Prior studies have linked such schedules to delayed sleep onset, reduced REM sleep, and circadian rhythm misalignment [6,7]. These physiological disruptions have downstream effects on cognitive performance, emotion regulation, and patient safety.

Late-night digital device use is another frequent contributor to poor sleep quality. Exposure to blue light from screens can suppress melatonin production, delaying sleep onset and reducing the total sleep duration [8,9]. Environmental noise, particularly in hostel accommodations, also contributed to disturbances, underscoring the importance of living conditions for resident wellness.

Our findings parallel those of Veena et al., who reported an average sleep duration of 5.7 hours among South Indian residents, well below the recommended 7–9 hours for young adults [3]. Chronic sleep restriction may predispose residents to burnout, anxiety, depression, and impaired clinical performance.[10] The utilised an adequate sample size encompassing all three training years and employed a validated instrument, the Pittsburgh Sleep Quality Index (PSQI), to assess sleep quality.

Table 4 : Distribution of associated factors associated with sleep quality among postgraduate medical students

Associated Factor	Affected (N)	Percentage
Frequent Night Duties (≥2/week)	160 / 315	50.8%
Caffeine or Substance Use	246 / 315	78.2%
Scrolling Social Media Before Bed	294 / 315	93.5%
Academic Stress or Night Shifts	182 / 315	58.1%
Environmental Disturbances	264 / 315	83.9%
Medical Illness (self-reported)	94 / 315	30.0%
Major Life Events (last 6 months)	43 / 315	13.7%

Additionally, it includes context-specific factors pertinent to postgraduate trainees. However, the limitations of this study include its cross-sectional design, which restricts causal inference, and reliance on self-reported data, which may introduce recall and social desirability biases. Furthermore, the single-centre design may limit the generalizability of the findings. The checklist of associated factors was self-developed and not validated, potentially limiting comparability with other studies and reducing reproducibility.

Conclusion

This study revealed a high prevalence of poor sleep quality among postgraduate medical trainees, particularly in the first and final years of training. The key contributing factors included academic workload, irregular duty hours, digital media use before bedtime, and suboptimal living conditions. Institutional interventions, such as regulating duty hours, promoting sleep hygiene education, improving hostel environments, and encouraging healthy digital behaviors, are warranted to safeguard resident health and clinical performance. Further multicenter longitudinal studies are recommended to evaluate the impact of such interventions on trainee well-being.

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