

## Original Article

# Sleep Quality Among Medical Students and Healthcare Professionals During the COVID-19 Pandemic: A Cross-Sectional Study Using the Pittsburgh Sleep Quality Index

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### ABSTRACT

**Background:** The COVID-19 pandemic introduced unprecedented stressors for healthcare workers and medical trainees, potentially disrupting sleep. This study assessed sleep quality using the Pittsburgh Sleep Quality Index (PSQI) among medical students and healthcare professionals during the early pandemic and identified demographic predictors of poor sleep.

**Methods:** A cross-sectional survey enrolled 78 participants, including 70 first year MBBS students and eight faculty/medical officers. The PSQI assessed seven sleep components and a global score  $>5$  was taken as poor sleep. Statistical analyses included t tests, Pearson correlations, and linear/logistic regression.

**Results:** Mean global PSQI score was  $6.33 \pm 2.84$ , with 61.5% classified as poor sleepers. Most impaired components: sleep latency ( $1.33 \pm 0.87$ ), daytime dysfunction ( $1.15 \pm 0.84$ ), and subjective sleep quality ( $1.21 \pm 0.64$ ). Sleep medication use was minimal ( $0.15 \pm 0.46$ ). No significant sex differences emerged. Faculty showed non-significantly worse sleep efficiency and disturbances. Age correlated negligibly with global PSQI ( $r=0.07$ ). Regression models explained no variance in sleep quality; faculty had an elevated but not significant odds ratio for poor sleep (OR=2.35, 95% CI: 0.44–12.67). Most frequent disturbances: difficulty falling asleep (42%  $\geq 1$ /week), nocturnal awakenings (38%), and bathroom trips (31%).

**Conclusions:** Poor sleep quality was highly prevalent (62% exceeding clinical threshold) among medical students and healthcare professionals during early COVID 19, with sleep onset difficulties and daytime dysfunction predominating. Demographic factors did not predict sleep quality, suggesting widespread impact. Targeted sleep health interventions for medical trainees and workers during public health crises are urgently needed.

**Keywords:** COVID-19, Healthcare workers, Insomnia, Medical students, Pittsburgh Sleep Quality Index, Sleep quality

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## INTRODUCTION

The COVID-19 pandemic has profoundly affected mental wellbeing and sleep health worldwide.<sup>[1,2]</sup> Sleep is essential for immune function, cognition, and emotional regulation.<sup>[3]</sup> Healthcare workers and medical students have been particularly vulnerable due to direct patient exposure, fear of viral transmission, increased workload, and abrupt educational disruptions.<sup>[4,5]</sup>

The Pittsburgh Sleep Quality Index (PSQI) is a validated, widely used instrument assessing seven sleep domains over one month; a global score >5 indicates poor sleep.<sup>[6,7]</sup> Pre pandemic studies already showed high rates of poor sleep among medical students (50–60%)<sup>[8]</sup>, and the pandemic has exacerbated these vulnerabilities. Systematic reviews report pooled mean PSQI scores around 6.7 and sleep disturbance prevalence of 35–40% among healthcare workers.<sup>[9,10]</sup> Female gender has been identified as a strong predictor.<sup>[9]</sup>

However, region specific data—particularly from the Indian subcontinent—remain limited.<sup>[11]</sup> This study aimed to: (1) assess sleep quality using the PSQI among medical students and healthcare professionals during early COVID 19; (2) compare sleep by sex and group (student vs. faculty); (3) examine age sleep relationships; (4) identify demographic predictors; and (5) characterize specific sleep disturbances.

## METHODS

**Study Design and Setting:** This cross sectional study was conducted at a tertiary care teaching hospital in India (September 29 – October 10, 2020) during early pandemic restrictions. Institutional ethics approval and informed consent were obtained.

**Participants:** Convenience sampling recruited 78 eligible participants ( $\geq 18$  years, medical students or faculty/medical officers). Exclusion criteria: pre existing diagnosed sleep disorders, prescription sleep medication for chronic insomnia, incomplete PSQI data, or active COVID 19 infection.

**Data Collection:** An anonymous online questionnaire (Google Forms) collected demographics and the 19 item PSQI. Data cleaning and scoring followed standard

algorithms.<sup>[6]</sup> A global PSQI >5 defined poor sleep.

**Statistical Analysis:** Descriptive statistics, independent t-tests (Cohen's d for effect sizes), Spearman correlations, multiple linear regression, and binary logistic regression were performed using Python and SPSS ( $\alpha=0.05$ , two tailed).

## RESULTS

**Participant Characteristics:** Of 78 participants, 46.2% were male, 53.8% female (mean age  $20.1 \pm 3.2$  years, range 18–49). Students comprised 89.7% ( $n=70$ ), faculty 10.3% ( $n=8$ ).

*Table 1: Demographic Characteristics of the Study Population (N = 78)*

Character-istic	Category	Frequency	%
Sex	Male	36	46.2
	Female	42	53.8
Age (years)	Mean (SD)	20.1	(3.2)
	Median (IQR)	19	19–20
	Range	18–49	
Group	Students (MBBS)	70	89.7
	Faculty/ Medical Officers	8	10.3

**PSQI Scores:** Mean global PSQI =  $6.33 \pm 2.84$  (median=6, IQR=4–8); 61.5% ( $n=48$ ) were poor sleepers (PSQI>5). Component means: sleep latency  $1.33 \pm 0.87$ , daytime dysfunction  $1.15 \pm 0.84$ , subjective sleep quality  $1.21 \pm 0.64$ . Sleep medication use was low ( $0.15 \pm 0.46$ ). Difficulty falling asleep (42%  $\geq 1$ /week) and nocturnal awakenings (38%  $\geq 1$ /week) were most frequent.

**Comparisons by Sex and Group:** No significant sex differences on any PSQI component or global score ( $p>0.05$ ; Cohen's d <0.2). Faculty vs. students showed no significant differences, but small to medium effects for sleep efficiency ( $d=0.41$ ) and disturbances ( $d=0.38$ ) favoured worse sleep among faculty. Age correlated negligibly

with global PSQI ( $p=0.07$ ,  $p=0.547$ ).

**PSQI Component and Global Scores:** The mean global PSQI score was 6.33 (SD = 2.84, median = 6, IQR = 4–8). Using the standard cutoff of >5, 48 participants (61.5%) were classified as poor sleepers. Table 3 presents descriptive statistics for each PSQI component and the global score.

**Table 2: PSQI Component and Global Scores (N = 78)**

Component	Mean	SD	Median	IQR	Range
C1: Subjective sleep quality	1.21	0.64	1	1–2	0–3
C2: Sleep latency	1.33	0.87	1	1–2	0–3
C3: Sleep duration	0.54	0.68	0	0–1	0–3
C4: Sleep efficiency	0.87	1.02	1	0–1	0–3
C5: Sleep disturbances	1.08	0.48	1	1–1	0–2
C6: Use of sleep medication	0.15	0.46	0	0–0	0–3
C7: Daytime dysfunction	1.15	0.84	1	0–2	0–3
<b>Global PSQI score</b>	<b>6.33</b>	<b>2.84</b>	<b>6</b>	<b>4–8</b>	<b>1–15</b>

The most impaired components were sleep latency (C2; mean 1.33), daytime dysfunction (C7; mean 1.15), and subjective sleep quality (C1; mean 1.21). Sleep duration (C3) was generally adequate (mean 0.54, corresponding to >7 hours of sleep on average), but sleep efficiency (C4) was compromised (mean 0.87, indicating mean efficiency approximately 82%). Use of sleep medication was minimal (C6 mean 0.15), with only 6 participants (7.7%) reporting any medication use during the past month.

Linear regression (age, sex, group) explained no variance (adjusted  $R^2 = -0.01$ ,  $p=0.555$ ). Logistic regression for poor sleep status was non-significant ( $\chi^2(3)=1.83$ ,  $p=0.609$ ). Faculty had an OR of 2.35 (95% CI: 0.44 12.67) for poor sleep; female sex OR=1.30 (0.52 3.26).

## DISCUSSION

This study found that 62% of medical students and healthcare professionals experienced clinically significant poor sleep during the early COVID-19 pandemic, with a

mean PSQI of 6.33—comparable to pandemic meta-analytic estimates (6.73)<sup>[9]</sup> and higher than pre-pandemic norms. The predominant impairments were sleep latency and daytime dysfunction, consistent with a hyperarousal model driven by pandemic-related stress and anxiety.<sup>[12,13]</sup>

Notably, sleep duration was relatively preserved, suggesting non-restorative sleep rather than insufficient quantity. This dissociation implies that stress reduces sleep quality without necessarily shortening total sleep time—a pattern requiring clinical attention. The very low use of sleep medication (7.7%) may reflect reluctance among medical trainees or limited access, highlighting an unmet need for non-pharmacological interventions such as cognitive-behavioral therapy for insomnia (CBT-I).<sup>[14]</sup>

Contrary to meta-analytic findings,<sup>[9]</sup> we observed no significant sex differences in sleep quality. The small sample and young age (mean 20 years) may have attenuated typical gender effects; shared environmental stressors in medical training could also reduce sex-based disparities. Similarly, age showed no correlation, likely due to the restricted age range. Faculty members had non-significantly worse sleep efficiency and disturbances (effect sizes  $d=0.41$  and  $0.38$ ), and a 2.35-fold higher odds of poor sleep, though confidence intervals were wide due to small faculty sample. This trend may reflect clinical responsibilities and administrative burdens during the pandemic.<sup>[15]</sup>

The absence of demographic predictors in regression models suggests that pandemic-related sleep disturbances cut across all subgroups, consistent with a “community disaster” model.<sup>[16]</sup> Universal stressors—fear of infection, disrupted routines, increased screen time, reduced physical activity—may overwhelm individual protective factors.

**Implications for Intervention:** High prevalence of poor sleep with minimal medication use calls for

scalable, evidence-based non-pharmacological strategies. CBT-I components (stimulus control, sleep restriction, cognitive restructuring) are first-line.<sup>[14]</sup> Medical schools should integrate sleep health education, adjust academic schedules, and provide accessible mental health support.<sup>[17,18]</sup> During public health crises, proactive sleep monitoring and wellness resources are essential.

**Limitations:** Cross-sectional design precludes causality; small sample (especially faculty n=8) limits power; convenience sampling may introduce bias; self-report is subject to recall error; no pre-pandemic baseline; single institution; unmeasured confounders (mental health, COVID-19 exposure, work hours). Future longitudinal, multi-institutional studies with objective measures (actigraphy) are needed.

## CONCLUSION

Poor sleep quality was highly prevalent (62%) among medical students and healthcare professionals during early COVID-19, driven by sleep onset difficulties and daytime dysfunction. Demographic factors did not predict sleep quality, indicating widespread impact. These findings underscore the urgent need for targeted sleep health interventions for medical trainees and healthcare workers during public health emergencies.

## DECLARATIONS

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**Data Availability:** Available from corresponding author on reasonable request.

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