



Digital Screen Time, Sleep Quality, and Their Predictors Among Medical Undergraduates at a Tertiary Care Centre: A Cross-Sectional Study

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Abstract

Introduction: Medical undergraduates are at particular risk of sleep disruption, given competing pressures of rigorous academics, clinical training, and the near-constant availability of digital devices. Screen-based device use before bedtime stands out as dominant modern-day disruptor of restful sleep. Hence, we intend to quantify sleep quality and digital screen time and their predictors among medical students. **Methods:** This was cross-sectional study enrolling 400 MBBS students at tertiary medical college, selected by stratified random sampling. Structured, self-administered questionnaire combining the PSQI and QueST was used for data collection. **Results:** Mean PSQI score was 7.21 ± 3.63 , and 65.75% of students were poor sleepers. Screen exposure during hour before bedtime was reported by 95.5% of participants, with 36.8% reporting use every-night. Social media was the predominant screen activity. Significant bivariate associations were observed between sleep quality and sleep duration, pre-sleep screen use, nocturnal phone checking, and perceived effects of screen use on sleep and daytime concentration. In multivariable logistic regression, compared with sleeping ≥ 8 hours, sleeping ≤ 5 hours (aOR: 3.639 95%CI: 1.185, 11.171), 6-hours (aOR: 4.319, 95%CI: 1.620, 11.513), and 7-hours (aOR: 3.080, 95%CI: 1.120, 8.471) was associated with higher odds of poor sleep quality. Reporting very good subjective sleep quality, compared with very poor subjective sleep quality, was associated with lower odds of poor sleep quality (aOR: 0.135, 95%CI: 0.018, 0.992). **Conclusion:** More than sixty five percent medical students had poor sleep, pre-bedtime social media use, a modifiable predictor. Phase-wise integration of healthy sleep practices and practical digital wellness measures into curriculum is strongly recommended.

Key Words: Digital screen exposure, Medical students, Pittsburgh Sleep Quality Index (PSQI), Questionnaire for screentime (QueST), Sleep quality

Introduction

Sleep underpins virtually every aspect of human functioning - from physical repair and immune defence to memory encoding and emotional stability. Young adults generally need seven to nine hours per night.^[1] For MBBS students, however, such adequate rest is seldom achievable. Long lecture schedules, overnight clinical duties, examination seasons, and the looming pressure of professional milestones collectively whittle away the hours that should be given to sleep.^[2]

Digital technology has added another layer to this problem. Students reach for their phones, laptops, and tablets well into the night - not only for studying, but for scrolling social media, chatting, and streaming content. The blue light that screens emit curbs melatonin production, shifts the body clock later, and keeps the mind in a state of arousal that makes falling asleep

harder.^[3] Bedtime mobile phone use has itself been linked to shorter, more fragmented sleep in adult populations, and short-form video platforms in particular appear to prolong screen exposure well past students' intended bedtimes.^[4,5] Evidence from student populations also suggests that patterns of digital learning and sleep hygiene warrant attention.^[6]

Sleep quality itself is commonly measured with the Pittsburgh Sleep Quality Index (PSQI), a seven-component tool covering subjective quality, latency, duration, efficiency, disturbances, medication use, and daytime functioning; a global score above five flags clinically meaningful sleep problems.^[7] Studies among medical students have reported substantial burdens of poor sleep, although estimates vary between settings and study populations.^[8-10] Reviews of the broader adolescent and young-adult literature consistently link heavier screen exposure, particularly in the evening, to

shorter sleep duration and poorer subjective sleep quality.^[11-14]

India's medical degree spans five and a half years, moving from the preclinical phase through paraclinical work and into full clinical training. Each phase brings its own stressors and its own screen-use habits. Despite a growing body of global research, few studies have tried to capture screen time in all its forms - academic use, social media, gaming, entertainment - and link it to systematically measured sleep quality across every year of the programme within a single Indian institution.

In a large sample of Indian medical students, Kanyadi et al.^[9] found that more than two-thirds had poor sleep quality by PSQI criteria, with bedtime technology use emerging as a leading contributor. Verma P et al.^[15] similarly reported poorer sleep quality among students with heavier pre-bedtime device use in a tertiary care institute of Himachal Pradesh. Short-form video use has also been examined in relation to sleep quality in college populations. These findings support evaluating screen behaviours and sleep quality together, without assuming a causal relationship.

This study aimed to assess sleep quality and digital screen exposure among students from all four MBBS phases at a tertiary teaching hospital in Karnataka, India, and to examine associations between sleep quality, screen-related behaviours, and selected sociodemographic and lifestyle factors.

The objectives of the study was to assess sleep quality among medical undergraduates across all phases using the Pittsburgh Sleep Quality Index (PSQI); to quantify screen time across categories (social media, academics, gaming, and reel viewing) using the QueST; and to determine the association between screen time and sleep quality, and to identify other sociodemographic and lifestyle factors influencing sleep.

Methods

A cross-sectional survey design was adopted. The study was conducted at a tertiary teaching medical college hospital in Karnataka, India, affiliated to Rajiv Gandhi University of Health Sciences. Data collection spanned three months.

Study Population and Sample Size:

All currently enrolled MBBS students across the four phases were eligible. Using the formula $n = Z^2pq/d^2$, with a prevalence of poor sleep quality of 44.6% drawn from Peepre et al.^[10] 95% confidence ($Z = 1.96$), 5% absolute precision, gives 380 and a 5% non-response buffer, the required sample came to 399 rounding up to 400. To ensure all phases were equally represented, 100

students were drawn from each phase (Phase I, II, III Part 1, and III Part 2) by stratified random sampling.

Inclusion and Exclusion Criteria:

Eligible students were aged 18–25 years, in regular attendance throughout the academic year, and willing to give written consent.

Study Tools:

Data were gathered through a structured, self-administered questionnaire that covered basic sociodemographic and lifestyle details alongside two validated measurement tools.

Pittsburgh Sleep Quality Index (PSQI): A globally validated self-report tool covering the past month across seven domains: subjective quality, sleep latency, duration, efficiency, night-time disturbances, sleep medication use, and daytime dysfunction. Each domain scores 0–3; the composite ranges from 0 to 21, and a score above five marks clinically significant sleep difficulty.^[7]

Questionnaire for Screen Time (QueST): A validated screen-time questionnaire assessing five types of use - academic study, work or internship tasks, video viewing, gaming, and social media or messaging - on both weekdays and weekends. Time is logged in hours and minutes.^[18]

Data Collection Procedure:

Following ethics committee clearance and written consent from each participant, the questionnaire was administered via Google Forms in a quiet setting. Alongside the two instruments, information was collected on family structure, accommodation type, physical activity, caffeine and tobacco habits, and screen behaviour. Students whose scores indicated poor sleep quality were provided group health education on better sleep practices at the end of the study.

Statistical Analysis:

All analyses used IBM SPSS Statistics version 22 (IBM Corp., Armonk, NY, USA). Categorical data are presented as frequencies and percentages; continuous variables as mean $\pm$ SD or median with IQR depending on data distribution. Chi-square and Mann-Whitney U tests were used for bivariate comparisons. Univariate and multivariate binary logistic regression identified independent predictors of poor sleep quality. Statistical significance was set at $p < .05$.

Ethical Considerations:

The study received ethical clearance from the Institutional Research Committee of the study institution. (No. SMCRI/IEC/2026-27/275) Each participant

provided written informed consent before enrolment. Anonymity and data confidentiality were strictly maintained throughout the study. Students with poor sleep quality scores received targeted health education; those with severe scores were referred for further clinical evaluation.

Results

All 400 enrolled students completed the study - 100 from each phase. The mean global PSQI score was 7.21 ± 3.63 (Median 7.00, IQR 4; Range 0–20). Using the standard cut-off of > 5 , two-thirds of participants (263; 65.75%) were categorised as poor sleepers, while the remaining 137 (34.25%) were good sleepers.

Table 1:
Sociodemographic and Lifestyle Characteristics of Participants (N=400)

Characteristic	n, %
Phase	
Phase I	100, 25%
Phase II	100, 25%
Phase III Part 1	100, 25%
Phase III Part 2	100, 25%
Gender	
Female	250, 62.5%
Male	150, 37.5%
Residence	
Hostel	311, 77.75%
With family	57, 14.25%
Paying guest	15, 3.75%
Others	17, 4.25%
Family type	
Nuclear	328, 82%
Joint	29, 7.25%
Three-generation	34, 8.5%
Single parent	9, 2.25%
Relationship status	
Single	368, 92%
In a relationship	15, 3.75%
Complicated	17, 4.25%
Physical activity/week	
None	83, 20.75%
1–2 hours	173, 43.25%
3–5 hours	81, 20.25%
≥ 6 hours	63, 15.75%
Caffeine intake	
Never	117, 29.25%
1 cup/day	214, 53.5%
2–3 cups/day	66, 16.5%
≥ 4 cups/day	3, 0.75%
Tobacco use	
Never	390, 97.5%
Occasionally	6, 1.5%
Alcohol use	
Never	369, 92.25%
Occasionally	29, 7.25%

Females made up 62.5% of participants. Most students lived in hostel accommodation (77.75%), came from nuclear families (82.0%), and were single (92.0%). One

in five (20.75%) was entirely sedentary. Regular caffeine intake was common- 70.75% consumed it daily. Whereas tobacco and alcohol use were rare (2.5% and 7.75% respectively). Phase-wise comparisons of these background characteristics returned no statistically significant differences. (Table 1)

Table 2:
PSQI Component Scores and Overall Sleep Quality Distribution (N=400)

PSQI Components	n, %
Overall Subjective Sleep Quality	
Very Good	75, 18.75%
Good	220, 55%
Poor	85, 21.25%
Very Poor	20, 5%
Sleep Latency (component score)	
0 (optimal)	116, 29%
1 (mild)	135, 33.75%
2 (moderate)	114, 28.5%
3 (severe)	35, 8.75%
Total Sleep Duration	
≤ 5 hours	85, 21.25%
5–6 hours	181, 45.25%
6–7 hours	101, 25.25%
≥ 7 hours	33, 8.25%
Sleep Efficiency	
$> 85\%$	265, 66.25%
75–84%	51, 12.75%
65–74%	42, 10.5%
$< 65\%$	42, 10.5%
Sleep Disturbances	
0 (none)	49, 12.25%
1–9 (mild)	322, 80.5%
10–18 (moderate)	27, 6.75%
19–27 (severe)	2, 0.5%
Sleep Medication Use	
Not during past month	369, 92.25%
$< \text{Once/week}$	22, 5.5%
$> \text{Once a week}$	9, 2.25%
Daytime Dysfunction	
Not during past month	238, 59.5%
$< \text{Once/week}$	100, 25%
1–2 times/week	43, 10.75%
≥ 3 times/week	19, 4.75%
Global PSQI Category	
Good Sleep Quality (≤ 5)	137, 34.25%
Poor Sleep Quality (> 5)	263, 65.75%

For the PSQI component scores, nearly three-quarters of students (73.75%) rated their own sleep as good or very good, yet the objective PSQI score placed 65.75% in the poor sleep category, striking the gap between self-perception and measured reality. Sleep duration was chronically short for most: 45.25% slept 5–6 hours and 21.25% managed five hours or less on a typical night. Sleep efficiency was preserved above 85% in 66.25%. Night-time disturbances were near-universal, with 80.5% scoring in the mild range. Around 40.5% reported some degree of daytime dysfunction at least once a week. Sleep medication use was uncommon, with only 5.5% reporting any use in the past month. (Table 2)

Table 3:
Digital Screen Exposure Patterns and Behaviours (N= 400)

Screen Behaviour Variable	n, %
Primary screen purpose	
Social media	186, 46.5%
Academics	116, 29%
Videos/Over the top platforms	51, 12.75%
Exam preparation	31, 7.75%
Gaming	16, 4%
Screen use within 1 hr before sleep	
Always	147, 36.75%
Often	121, 30.25%
Occasionally	114, 28.5%
Never	18, 4.5%
Device used before sleep	
Smartphone	358, 89.5%
Tablet	25, 6.25%
Television	7, 1.75%
Laptop	10, 2.5%
Phone location at night	
Within arm's reach	303, 75.75%
In room only	85, 21.25%
Outside bedroom	12, 3%
Nocturnal phone checking	
Never	162, 40.5%
Rarely	138, 34.5%
Often	58, 14.5%
Always	42, 10.5%
Main reason for late-night screen use	
Reels/short videos	172, 43%
Entertainment	107, 26.75%
Academics	87, 21.75%
Messaging/calls	34, 8.5%
Self-reported impact on sleep	
Not at all	100, 25%
A little	172, 43%
Moderately	76, 19%
Severely	52, 13%
Impact on academic concentration	
Never	114, 28.5%
Sometimes	176, 44%
Often	62, 15.5%
Always	48, 12%

Social media was the predominant daily screen activity (46.5%), led by Instagram (39.0%) and YouTube (18.75%). An overwhelming proportion (95.5%) used a screen in the hour before bed at least on some nights, among which 36.75% this was a nightly habit. The smartphone was the device of choice for almost all pre-sleep screen users (89.5%), and three-quarters kept it within arm's reach overnight. Watching reels or short-form video was the most commonly stated reason for staying on a screen late at night (43.0%). Three out of four students felt their screen use had at least some impact on their sleep, and 71.5% noted that it interfered with their concentration in class or during self-study on at least some occasions. The mean daily screen time was 5.17 ± 2.19 hours (95%CI: 4.98, 5.37; range: 1–15 hours), while the mean screen time on individual devices was 4.73 ± 2.42 hours (95%CI: 4.52, 4.95; range: 1–16 hours).

Both variables showed a positively skewed distribution. (Table 3)

Table 4 shows that MBBS phase ($p = 0.384$), gender ($p = .871$), family type ($p = .856$), physical activity ($p = .974$) and place of residence ($p = .134$) were not significantly related to sleep quality category. By contrast, nightly sleep duration ($p < .001$) and room-sharing arrangement ($p = .028$) were both significantly associated. Though the phase difference was not statistically significant, Phase II had the worst picture - 72% poor sleepers - with Phase III Part 1 not far behind at 67%.

Table 5 shows that four screen-related behaviours were each independently associated with poor sleep: how often screens were used before bed ($p < .001$), how often the phone was checked at night ($p < .001$), perceived impact of screen use on sleep quality ($p < .001$), and perceived impact on classroom concentration ($p < .001$). Weekend screen time was significant ($p = .011$); weekday totals fell just short ($p = .062$). Breaking the data down further, 72.1% of students who always used screens before sleep were poor sleepers, and among those who felt screens affected them moderately or severely, the proportion of poor sleepers rose above 78%.

The Mann–Whitney U test showed statistically significant differences between good and poor sleepers across all seven PSQI components ($p \leq .001$). Poor sleepers had higher mean ranks for all components, with the largest differences observed for daytime dysfunction ($Z = -12.292$) and subjective sleep quality ($Z = -11.389$). (Table 6)

In the multivariable logistic regression analysis, sleep duration of ≤ 5 hours, 6-hours, and 7-hours was significantly associated with higher odds of poor sleep quality compared with the reference category of ≥ 8 hours. The adjusted odds ratios were 3.639 (95%CI: 1.185, 11.171; $p = .024$), 4.319 (95%CI: 1.620, 11.513; $p = .003$), and 3.080 (95%CI: 1.120, 8.471; $p = .029$), respectively. Subjective sleep quality rated as “very good” was associated with lower odds of poor sleep quality compared with “very poor” subjective sleep quality (aOR: 0.135; 95%CI: 0.018, 0.992; $p = .049$). All four associations were statistically significant ($p < .05$) (Table 7)

Discussion

In this study of 400 MBBS students at a Karnataka teaching hospital, 65.75% crossed the PSQI threshold for poor sleep. This falls between the 76.75% reported by Verma P et al.^[15] and the 33.8% from Rebello et al.^[20] in Karnataka, while matching the 69.3% of Kanyadi et al.^[9] closely. The mean PSQI of 7.21 ± 3.63 is comparable to what Verma et al.^[15] found in Indian undergraduates.

Table 4:**Association between Sleep Quality Category and Sociodemographic and Lifestyle Variables (N = 400)**

Variable	Good Sleepers N (%)	Poor Sleepers N (%)	Total	χ^2	p-value
Phase					
Phase I	38 (38.0)	62 (62.0)	100	3.053	.384
Phase II	28 (28.0)	72 (72.0)	100		
Phase III Part 1	33 (33.0)	67 (67.0)	100		
Phase III Part 2	38 (38.0)	62 (62.0)	100		
Gender					
Female	86 (34.4)	164 (65.6)	250	0.027	.871
Male	51 (34.0)	99 (66.0)	150		
Family type					
Nuclear	113 (34.5)	215 (65.5)	328	0.033	.856
Others	24 (33.3)	48 (66.7)	72		
Residence					
Hostel	102 (32.8)	209 (67.2)	311	4.021	.134
With family	26 (45.6)	31 (54.3)	57		
Others	12 (37.5)	20 (62.5)	32		
Sleep duration					
≤5 hours	21 (24.7)	64 (75.3)	85	32.93	< .001
5-6 hours	51 (28.2)	130 (71.8)	181		
6-7 hours	40 (39.6)	61 (60.4)	101		
≥7 hours	25 (75.8)	8 (24.2)	33		
Room-sharing arrangement					
Alone	23 (35.4)	42 (64.6)	65	7.118	.028
With 2-3 persons	94 (33.2)	189 (66.8)	283		
>3 persons	8 (15.3)	44 (84.6)	52		
Physical activity (Q14)					
None	30 (36.1)	53 (63.9)	83	0.053	.974
1-2 hours	65 (37.6)	108 (62.4)	173		
≥3 hours	53 (36.8)	91 (63.2)	144		

Table 5:**Association between Sleep Quality Category and Digital Screen Exposure Variables (N = 400)**

Screen Variable	Good N (%)	Poor N (%)	χ^2	p-value
Pre-sleep screen use				
Never	8 (44.4)	10 (55.6)	17.94	< .001
Occasionally	56 (49.1)	58 (50.9)		
Often	32 (26.4)	89 (73.6)		
Always	41 (27.9)	106 (72.1)		
Nocturnal phone checking				
Never	74 (45.7)	88 (54.3)	19.065	< .001
Rarely	43 (31.2)	95 (68.8)		
Often	11 (19.0)	47 (81.0)		
Always	9 (21.4)	33 (78.6)		
Impact of screen on sleep				
Not at all	52 (52.0)	48 (48.0)	25.06	< .001
A little	59 (34.3)	113 (65.7)		
Moderately	15 (19.7)	61 (80.3)		
Severely	11 (21.2)	41 (78.8)		
Impact on academic concentration				
Never	55 (48.2)	59 (51.8)	18.6	< .001
Sometimes	58 (33.0)	118 (67.0)		
Often	16 (25.8)	46 (74.2)		
Always	8 (16.7)	40 (83.3)		
Weekday screen time, hours				
< 2 hours	20 (51.3)	19 (48.7)	7.35	.062
2-4 hours	50 (31.3)	110 (68.7)		
5-8 hours	47 (30.9)	105 (69.1)		
> 8 hours	20 (40.8)	29 (59.2)		
Weekend screen time, hours				
< 2 hours	11 (44.0)	14 (56.0)	11.076	.011
2-4 hours	36 (49.3)	37 (50.7)		
4-8 hours	57 (30.0)	133 (70.0)		
> 8 hours	33 (29.5)	79 (70.5)		

Table 6:

Comparison of Pittsburgh Sleep Quality Index (PSQI) Component Scores Between Good and Poor Sleepers Using the Mann–Whitney U Test

PSQI component	Mean rank: Good sleepers	Mean rank: Poor sleepers	Mann–Whitney U	Z; p-value
Subjective sleep quality	118.2	243.37	6,741	–11.389; <.001
Sleep latency	140.27	231.87	9,764	–7.942; <.001
Sleep duration	134.54	234.86	8,978	–8.763; <.001
Sleep efficiency	141.75	231.1	9,966	–8.805; <.001
Sleep disturbances	166.17	218.38	13,310	–6.684; <.001
Sleep medication use	187.85	207.09	16,280	–3.407; .001
Daytime dysfunction	105.02	250.24	4,935	–12.292; <.001

Table 7:

Multivariable Logistic Regression Analysis of Factors Associated with Sleep Quality Among Medical Undergraduates (N = 400)

Predictor / category	SE	Adjusted OR	95% CI	p-value
Sleep duration ≤5 h (ref: ≥8 h)	0.572	3.639	1.185, 11.171	.024
Sleep duration 6 h (ref: ≥8 h)	0.5	4.319	1.620, 11.513	.003
Sleep duration 7 h (ref: ≥8 h)	0.516	3.080	1.120, 8.471	.029
Subjective quality: very good (ref: Very poor)	1.018	0.135	0.018, 0.992	.049

Variations across studies reflect differences in local academic pressures, hostel norms, and eligibility criteria. What the data make plainly clear is the gap between self-perception and objective classification: 73.75% of students considered their own sleep good or very good, yet the PSQI labelled 65.75% as poor sleepers. Students appear to have quietly accepted broken, shortened sleep as the cost of medical training - and that normalisation is itself a concern worth addressing.

Perhaps the most telling finding was how pervasive screen use before bedtime had become. Only 4.5% of students never used a screen in the final hour before sleep; the remaining 95.5% did so at least occasionally, and more than a third made it a nightly routine. The smartphone was the device involved in nearly nine out of ten cases. This matters because the short-wavelength blue light emitted by phone and laptop screens blunts the pineal gland's melatonin output, pushes the sleep-wake cycle later, and keeps the cortex activated through the notifications, social comparisons, and rapid-fire content that define social media and messaging apps.^[3,5]

Social media accounted for the largest share of daily screen time (46.5%), with Instagram and YouTube the dominant platforms. Watching reels was the top reason given for staying on a screen late at night (43.0%). This pattern reflects a broader global concern: algorithmically curated short-form content is engineered for compulsive viewing, and students find it difficult to put down the phone even when they know they should sleep. Sami PH et al. made a related observation, showing that students who depended more on digital resources for learning reported markedly poorer sleep outcomes than those using traditional textbooks.^[6]

Jilisha et al.^[16] reported a high prevalence of nomophobia among college students, highlighting problematic

smartphone-use patterns. Feng et al.^[17] found an association between short-video addiction and poorer sleep quality, with improvements following intervention.

Chi-square testing gave a consistent set of results. Using screens before bed, waking to check the phone at night, feeling that screens disturb one's sleep, and feeling that screens hurt daytime concentration- all four were significantly associated with poor sleep quality ($p < .001$ in each case). Total weekend screen time was also significant ($p = .011$). Weekday totals narrowly missed the threshold ($p = .062$), which might partly reflect students compensating with slightly longer sleep on weekdays even as their leisure screen use climbs at weekends.

In the multivariate model, sleep duration stood apart as the single strongest predictor. Getting ≤5 hours increase the odds of being a poor sleep quality by 263.9% (aOR 3.639, $p = .024$) relative to sleeping ≥8 hours, and six hours of sleep also increase odds of poor sleep quality (aOR 4.319, $p = .003$). Alsagga et al.^[2] arrived at the same conclusion in their Saudi cohort: briefer sleep directly predicted worse PSQI scores. The American Academy of Sleep Medicine sets ≥7 hours as the minimum for healthy adults,^[1] yet the majority of students in this study habitually slept below that threshold.

In the present study, sleep quality was significantly associated with sleep duration and room-sharing arrangement. Several screen-related behaviours, including pre-sleep screen use, nocturnal phone checking, and perceived effects of screen use on sleep and academic concentration, also showed significant bivariate associations with sleep quality. These findings highlight the coexistence of sleep-related difficulties and screen-use behaviours among medical undergraduates. Screen time appear to impair sleep quality through a physiological mechanism melatonin suppression and cortical arousal and that makes pre-bedtime screen

behaviour a specific, actionable target for intervention.

The Mann-Whitney U testing showed that good and poor sleepers differed on every PSQI component, with all p values $\leq .001$. The gap was widest for daytime dysfunction ($Z = -12.292$) and subjective sleep quality ($Z = -11.389$), underlining that poor sleep does not stay in the bedroom - it spills over into how students function during the day. The smallest difference was in sleep medication use ($Z = -3.407$), which simply reflects how few students in this age group resort to tablets or capsules for their sleep.

Phase II had the highest rate of poor sleepers (72%), and Phase III Part 1 was close behind (67%). The paraclinical years with its demanding across multiple subjects simultaneously Pathology, Pharmacology and Microbiology all run together with university examinations on the horizon. Yet the phase-wise difference did not reach significance ($p = .384$), which tells an important story: sleep problems are not confined to one particularly stressful year. They pervade the entire programme.

Gender did not significantly predict sleep quality in this cohort ($p = .746$), which runs counter to some prior work suggesting female students sleep worse.^[19] The high proportion living in shared hostel accommodation (77.75%) likely levels the playing field in terms of sleep environment, bedtimes, and daily routine. Physical activity, caffeine, tobacco, and alcohol also failed to reach significance, probably because substance use was genuinely rare here and activity levels did not vary enough to produce a detectable effect.

Students who personally felt that screens affected their sleep moderately or severely were still poor sleepers at rates above 78%. Knowing the harm, it turns out, does not automatically produce change. Habitual phone use at night is reinforced by social norms, peer behaviour, and the compulsive design of short-form video platforms. This gap between awareness and action mirrors what is well documented in behavioural science literature and suggests that information campaigns alone will not move the needle structural and environmental changes are also needed.

These findings carry several practical implications. Healthy sleep practices and digital wellness must be woven into the MBBS curriculum from Phase I onwards rather than reserved for psychiatry or pharmacology modules in later years. Institutional support should go further soft Wi-Fi curfews in hostels, awareness campaigns around reel-watching at night, and peer-led wellness groups are all worth piloting. Clinically, educators need to appreciate that a student whose sleep quality is consistently poor may struggle to concentrate

during ward rounds or make safe clinical decisions, raising genuine patient safety concerns for Phase III students. Finally, a longitudinal study tracking the same cohort through all phases would add important clarity about when sleep deteriorates most and who is most at risk.

Strengths and Limitations

The study's main strengths are its equal phase-stratified sampling, the simultaneous deployment of two validated tools, and its adequate sample of 400 students. On the other side, the cross-sectional design cannot establish causation, and all outcomes depend on self-report, which introduces recall bias. The single-institution setting may restrict how widely the results can be applied. Objective sleep measurement actigraphy or polysomnography was not feasible within this study's scope.

Conclusion

Poor sleep quality was prevalent among medical undergraduates, affecting 65.75% of participants. Sleep duration, room-sharing arrangement and several screen-related behaviours were significantly associated with sleep quality in bivariate analyses. These findings support the need for sleep-health education and digital-wellness initiatives among medical students. Further studies using verified multivariable analyses and longitudinal designs are needed to clarify the independent contributions of sleep habits and screen use to sleep quality.

Recommendations

Medical colleges may consider integrating sleep-health education and digital-wellness strategies from Phase I onwards, including practical advice on reducing device use immediately before bedtime and limiting nocturnal phone checking. Institutions could pilot peer-led wellness activities and evaluate them before adopting wider policies. These are recommendations for consideration; the present cross-sectional study did not test the effectiveness of any intervention.

Declarations

Conflicts of Interest: None declared.

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full responsibility for the accuracy, integrity, and final content of the manuscript.

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References

- Watson NF, Badr MS, Belenky G, Bliwise DL, Buxton OM, Buysse D, et al. Recommended Amount of Sleep for a Healthy Adult: A Joint Consensus Statement of the American Academy of Sleep Medicine and Sleep Research Society. *Sleep*. 2015 Jun 1;38(6):843-4. doi:10.5665/sleep.4716
- Alsaggaf MA, Wali SO, Merdad RA, Merdad LA. Sleep quantity, quality, and insomnia symptoms of medical students during clinical years. Relationship with stress and academic performance. *Saudi Med J*. 2016 Feb;37(2):173-82. doi:10.15537/smj.2016.2.14288
- Höhn C, Hahn MA, Gruber G, Pletzer B, Cajochen C, Hoedlmoser K. Effects of evening smartphone use on sleep and declarative memory consolidation in male adolescents and young adults. *Brain Commun*. 2024 May 17;6(3):fcae173. doi:10.1093/braincomms/fcae173
- Exelmans L, Van den Bulck J. Bedtime mobile phone use and sleep in adults. *Soc Sci Med*. 2016 Jan;148:93-101. doi:10.1016/j.socscimed.2015.11.037
- Zhao Z, Kou Y. Effect of short video addiction on the sleep quality of college students: chain intermediary effects of physical activity and procrastination behavior. *Front Psychol*. 2024 Jan 11;14:1287735. doi:10.3389/fpsyg.2023.1287735
- Sami HL, Syeda Fatemah Raza Zaidi, Haroon MA, Ata Ul Haiy. Comparison Of Sleep Hygiene Index In Virtual, Textbook And Hybrid Learners In Undergraduate Students. *Int J Med Stud*. 2025 Jan. 1;12:S355.
- Buyse DJ, Reynolds CF 3rd, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry Res*. 1989 May;28(2):193-213. doi: 10.1016/0165-1781(89)90047-4
- Sadeghi N, Rezaeian S, Janatolmakan M, Mohammadi MM, Heidarian P, Khatony A. The relationship between sleep quality and nomophobia among medical students. *BMC Med Educ*. 2025 Sep 2;25(1):1246. doi:10.1186/s12909-025-07847-8
- Kanyadi SR, Shindhe VM, Kamate RP, Javali SB. Sleep Hygiene Practices and Sleep Quality Among Undergraduate Medical Students: A Cross-Sectional Study. *Natl J Community Med*. 2025 Sep. 1;16(09):879-86. doi:10.55489/njcm.160920255548
- Peepre K, Tiwari Y, Patel LM, Thakur A. Sleep Quality and Self-Perceived Stress among Medical Students of Tertiary Care Hospital of District Shahdol (MP), India: A Cross Sectional Survey. *Indian Journal of Public Health Research and Development*. 2026 January-March. 16(1):261-267. doi:10.37506/8pkrc004
- Cain N, Gradisar M. Electronic media use and sleep in school-aged children and adolescents: A review. *Sleep Med*. 2010 Sep;11(8):735-42. doi:10.1016/j.sleep.2010.02.006
- Hale L, Guan S. Screen time and sleep among school-aged children and adolescents: a systematic literature review. *Sleep Med Rev*. 2015 Jun;21:50-8. doi:10.1016/j.smrv.2014.07.007
- Twenge JM, Krizan Z, Hisler G. Decreases in self-reported sleep duration among U.S. adolescents 2009-2015 and association with new media screen time. *Sleep Med*. 2017 Nov;39:47-53. doi:10.1016/j.sleep.2017.08.013
- LeBourgeois MK, Hale L, Chang AM, Akacem LD, Montgomery-Downs HE, Buxton OM. Digital Media and Sleep in Childhood and Adolescence. *Pediatrics*. 2017 Nov;140(Suppl 2):S92-S96. doi:10.1542/peds.2016-1758J
- Verma P, Jani H, Bhandari P, Patel B, Parlewar RK. Sleep quality and sleep hygiene among medical undergraduates in Himachal Pradesh (North India): A questionnaire-based study. *J Family Med Prim Care*. 2025 Oct;14(10):4199-4207. doi:10.4103/jfmpc.jfmpc_169_25
- Jilisha G, Venkatachalam J, Menon V, Olickal JJ. Nomophobia: A Mixed-Methods Study on Prevalence, Associated Factors, and Perception among College Students in Puducherry, India. *Indian J Psychol Med*. 2019 Nov 11;41(6):541-548. doi:10.4103/IJPSYM.IJPSYM_130_19
- Feng J, Ni H, Hou Z, Zhao L, Lei X. Effect of impact mechanism and intervention measures on sleep quality of college students addicted to short video: a randomly controlled trial. *Front. Behav. Neurosci*. 2026; 20:1714774. doi:10.3389/fnbeh.2026.1714774
- Knebel MTG, da Costa BGG, Dos Santos PC, de Sousa ACFC, Silva KS. The conception, content validation, and test-retest reliability of the Questionnaire for Screen Time of Adolescents (QueST). *J Pediatr (Rio J)*. 2022 Mar-Apr;98(2):175-182. doi:10.1016/j.jped.2021.05.004
- Gupta R, Taneja N, Anand T, Gupta A, Gupta R, Jha D et al. Internet Addiction, Sleep Quality and Depressive Symptoms Amongst Medical Students in Delhi, India. *Community Ment Health J*. 2021 May;57(4):771-776. doi:10.1007/s10597-020-00697-2
- Rebello CR, Kallingappa PB, Hegde PG. Assessment of perceived stress and association with sleep quality and attributed stressors among 1st-year medical students: A cross-sectional study from Karwar, Karnataka, India. *Tzu Chi Med J*. 2018 Oct-Dec;30(4):221-226. doi:10.4103/tcmj.tcmj_85_17