

SLEEP QUALITY AND ASSOCIATED FACTORS AMONG MEDICAL STUDENTS

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Abstract

Sleep is one of the most basic biological requirements, yet it is often treated as negotiable during medical education. Medical students commonly move between lectures, examinations, clinical duties, commuting, study sessions and social responsibilities, creating a routine in which sleep may be shortened or fragmented. This narrative review examines sleep quality among medical students and the factors associated with it, including academic workload, stress and anxiety, clinical schedules, electronic-device use, irregular routines, lifestyle habits and the learning environment. Evidence from large systematic reviews indicates that poor sleep quality is common in this population. A worldwide meta-analysis involving more than 59,000 medical students estimated poor sleep quality in about 55.6% of participants, while average sleep duration was approximately 6.5 hours per night. The Pittsburgh Sleep Quality Index (PSQI) is frequently used to assess sleep quality and provides a structured measure of subjective sleep and related daytime problems. Poor sleep is important not only because students feel tired; it may also affect concentration, memory, mood, academic functioning and overall wellbeing. The review argues that sleep should be treated as part of medical education and student health rather than as an optional personal habit. Practical solutions include sleep-health education, realistic scheduling, early identification of persistent sleep problems, accessible psychological support and a learning culture that does not reward chronic sleep restriction.

Keywords: sleep quality; medical students; sleep deprivation; Pittsburgh Sleep Quality Index; insomnia; daytime sleepiness; academic stress; anxiety; clinical training; sleep hygiene; student wellbeing.

1. Introduction

Medical education is intellectually demanding and emotionally intense. Students are expected to learn large volumes of information, perform in examinations, adapt to

clinical environments and gradually develop the judgement and communication skills required for healthcare practice. In this setting, sleep can easily become the first thing sacrificed when time feels limited. The problem is that sleep is not simply a period when the body is inactive. It is an active biological process involved in memory consolidation, emotional regulation, attention, immune function and recovery.

Research consistently suggests that sleep problems are common among medical students. A comprehensive meta-analysis of 57 studies involving 25,735 medical students estimated a pooled prevalence of poor sleep quality of 52.7% when the PSQI was used. A much larger worldwide review of 109 studies and 59,427 participants estimated poor sleep quality at 55.64% and average sleep duration at about 6.5 hours per night. These figures should not be interpreted as a diagnosis for every student, but they demonstrate that sleep disturbance is a widespread student-health issue rather than an occasional inconvenience. □cite□turn0search4□turn0search12□

This narrative review therefore looks beyond the question of how many medical students sleep poorly. It asks why sleep quality becomes difficult during medical training, what factors repeatedly appear in the literature, how poor sleep can affect daily functioning, and what medical schools and students can realistically do about it.

2. Understanding Sleep Quality

Sleep quality is broader than sleep duration. A student may spend seven hours in bed but still wake repeatedly, take a long time to fall asleep, feel unrefreshed, or experience excessive daytime sleepiness. The Pittsburgh Sleep Quality Index is one of the most widely used research instruments in this area. Developed by Buysse and colleagues, the PSQI assesses sleep over the previous month using seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication and daytime dysfunction. □cite□turn0search0□

The PSQI is useful because it captures the student's experience rather than focusing only on hours slept. Its measurement properties have been evaluated across clinical and non-clinical populations, with evidence supporting its reliability and validity as a screening measure. □cite□turn0search8□

For medical students, this distinction is particularly important. A timetable may appear to provide enough sleep opportunity, but anxiety before examinations, late-night studying, early clinical rounds, night duties or constant phone notifications can make actual sleep less restorative.

3. How Common Is Poor Sleep Among Medical Students?

The prevalence estimates vary between studies because researchers use different definitions, populations, countries and questionnaires. Even so, the overall pattern is remarkably consistent: a substantial proportion of medical students report poor sleep. The worldwide meta-analysis found poor sleep quality in 55.64% of students, excessive daytime sleepiness in 33.32%, and an average sleep duration of 6.5 hours per night. citeturn0search12

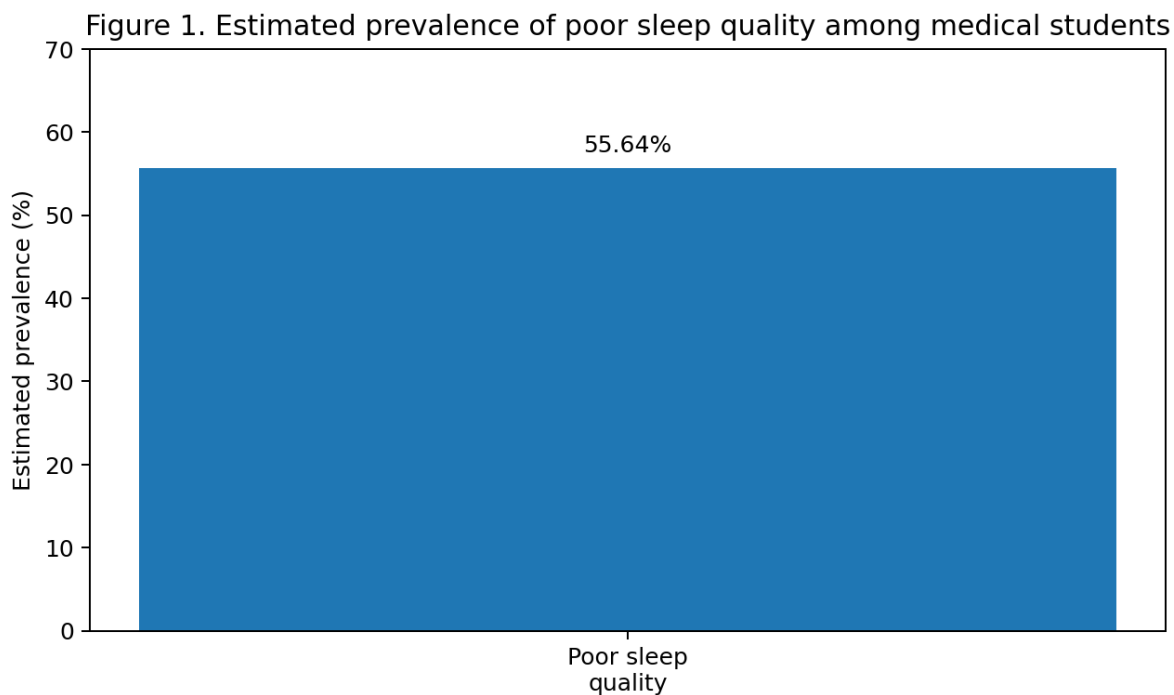


Figure 1. Estimated pooled prevalence of poor sleep quality among medical students from a worldwide meta-analysis. This figure reproduces the published pooled estimate and should not be interpreted as a prevalence estimate for a particular college or country.

Regional evidence also shows substantial sleep disturbance. A systematic review and meta-analysis of medical students in the Middle East and North Africa reported high levels of insomnia, excessive daytime sleepiness and circadian sleep–wake problems, with female sex, later academic years, anxiety, excessive internet use and poor academic performance appearing among significant associated factors in the included studies. citeturn0search3

More recent evidence from Saudi Arabia similarly highlights a high burden of insomnia and excessive daytime sleepiness and identifies psychological distress, academic stage and lifestyle factors among important correlates. These studies reinforce the idea that

sleep quality is influenced by the entire student environment rather than by one isolated behaviour. ☐cite☐turn0search5☐

4. Academic Workload and Examination Pressure

The academic structure of medical education is a major reason sleep becomes vulnerable. The volume of material can encourage students to study late into the night, especially before examinations. Some students use the quiet hours of the night because they believe they can concentrate better without interruptions. Others simply feel that sleeping means losing valuable study time.

This creates a misleading trade-off. An extra hour of studying may feel productive in the moment, but chronic sleep restriction can make attention, working memory, learning efficiency and emotional control more difficult. The relationship can also become circular: a tired student may study less efficiently, fall behind, experience more stress and then stay awake even later trying to catch up.

Clinical training adds another layer. Early morning rounds, long hospital days, commuting and occasional night duties can produce irregular sleep schedules. Students in later years may face a particularly complex combination of academic responsibility and clinical exposure. Regional evidence has repeatedly identified academic stage and clinical demands as relevant correlates of sleep disturbance. ☐cite☐turn0search3☐turn0search5☐

5. Stress, Anxiety and Emotional Wellbeing

Sleep and psychological wellbeing are closely connected. Medical students may experience examination anxiety, fear of poor performance, uncertainty about career progression, financial concerns, relationship difficulties and the emotional burden of encountering illness in clinical settings. When the mind remains highly alert at night, falling asleep can become difficult even when the body is tired.

The relationship also works in the opposite direction. Poor sleep can leave students more irritable, emotionally reactive and less able to cope with ordinary academic demands. Recent evidence specifically examining medical students has found an association between poor sleep and mental-health outcomes such as depression, anxiety and burnout, while also emphasizing that most available studies are cross-sectional and therefore cannot prove that poor sleep directly causes these conditions. ☐cite☐turn0search7☐

This bidirectional relationship is important. Telling a distressed student simply to 'sleep more' may be unrealistic if the underlying problem is severe anxiety or an unhealthy

workload. Sleep support should therefore be connected to broader student wellbeing and mental-health services.

6. Electronic Devices, Internet Use and Evening Habits

Smartphones, laptops and tablets are now embedded in medical education. Students may use them for lectures, question banks, clinical references and communication. The same devices can also extend study into the night and keep students mentally engaged when they should be winding down.

Evidence from regional reviews identifies excessive internet use as an associated factor for sleep disorders among medical students. The mechanism is probably not one-dimensional: prolonged screen exposure may delay bedtime, social media can increase cognitive arousal, and online studying can blur the boundary between academic and personal time. ☐ cite ☐ turn0search3 ☐

The practical lesson is not that students should avoid technology altogether. Rather, students may benefit from creating a predictable transition between study and sleep, reducing unnecessary notifications near bedtime and avoiding the habit of turning the bed into a permanent study station.

7. Lifestyle and Environmental Factors

Factor	How it may affect sleep	Possible student experience	Helpful response
Academic workload	Delays bedtime and reduces sleep opportunity	Late-night studying and morning fatigue	Plan study blocks earlier; protect a consistent sleep window.
Stress/anxiety	Increases mental arousal and disrupts sleep continuity	Racing thoughts or difficulty settling down	Use counselling/support when stress is persistent; develop a wind-down routine.
Clinical schedules	Create early starts or irregular hours	Short sleep or changing sleep times	Coordinate schedules where possible and protect recovery time.

Internet/device use	May delay bedtime and maintain cognitive arousal	'Just one more hour' of scrolling/studying	Set a device boundary before sleep and silence non-essential notifications.
Caffeine and stimulants	Can interfere with sleep when used late	Difficulty falling asleep despite fatigue	Keep caffeinated drinks earlier in the day when possible.
Poor sleep environment	Noise, light or uncomfortable conditions interrupt sleep	Frequent waking or unrefreshing sleep	Improve darkness, quiet, temperature and comfort.
Sedentary routine	May reduce healthy day–night rhythm	Low energy and irregular routine	Include regular daytime movement and outdoor light exposure.

8. Commonly Reported Associated Factors

Figure 2. Commonly reported factors associated with poorer sleep

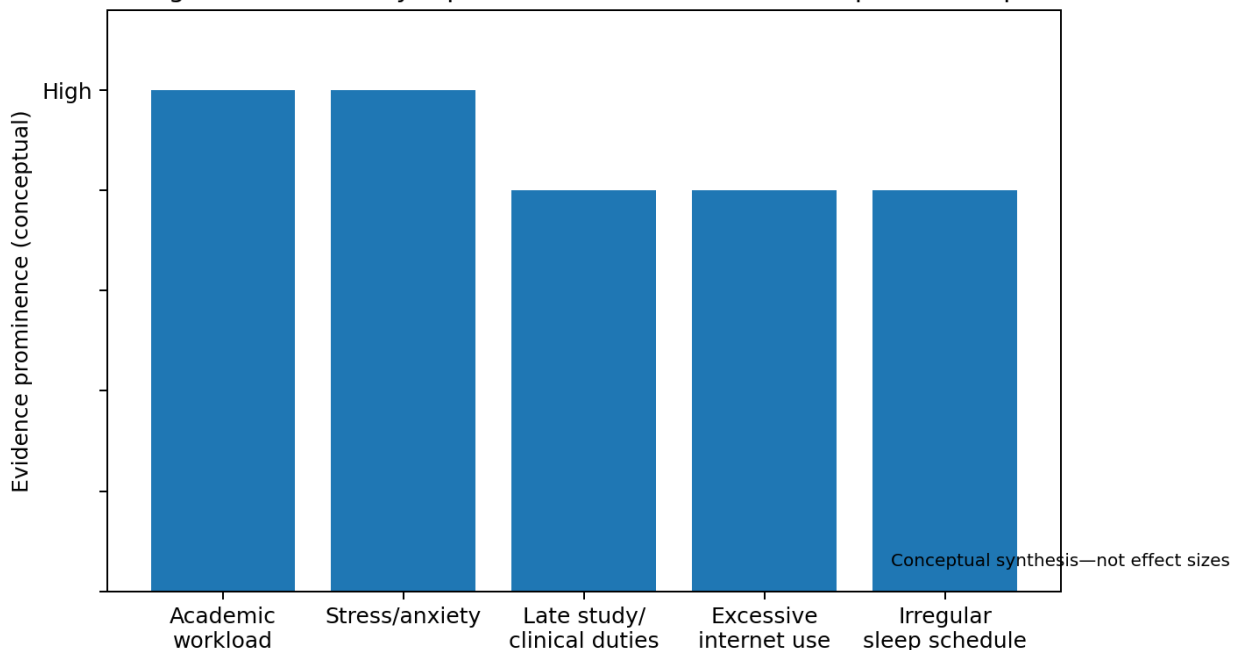


Figure 2. Conceptual synthesis of factors repeatedly reported in the literature as associated with poorer sleep among medical students. The bars represent evidence prominence in this review, not measured effect sizes.

Across the literature, no single factor explains poor sleep. Instead, medical students often experience several pressures simultaneously. A student may be studying for an examination, worrying about performance, using a laptop late at night, waking early for clinical duties and relying on caffeine the next morning. Each factor can reinforce the others.

This cumulative perspective is more useful than searching for a single culprit. It also explains why interventions need to operate at both individual and institutional levels.

9. Sleep Quality and Academic Performance

Students often sacrifice sleep because they believe it will improve academic performance. The evidence is more nuanced. Poor sleep has been associated with daytime dysfunction and, in some studies, poorer academic outcomes, but findings are not completely consistent. Regional meta-analytic evidence reports that sleep disorders can negatively affect academic performance, while some individual studies have found weak or no significant associations. □cite□turn0search3□turn0search5□

The uncertainty is understandable. Academic performance depends on many factors, including prior knowledge, teaching quality, study technique, mental health, socioeconomic circumstances and examination design. Sleep is one part of this larger picture. Still, the absence of a perfect causal estimate should not be interpreted as evidence that sleep is unimportant. Attention, memory and daytime functioning are biologically linked to adequate sleep, making sleep health a reasonable part of an effective learning strategy.

10. Practical Approaches for Medical Students

A realistic approach to sleep should focus on consistency rather than perfection. Students can begin by protecting a regular sleep opportunity, avoiding unnecessary all-night study sessions, keeping caffeine away from late hours, and creating a short period of reduced academic stimulation before bed. Daytime light exposure and regular physical activity can also support a stable sleep–wake rhythm.

Medical schools have an equally important role. Orientation programmes can teach students how sleep affects learning and health. Timetables can avoid unnecessary scheduling patterns that repeatedly force very early starts after late academic activities. Student counselling should be accessible without stigma, and persistent sleep problems should be evaluated rather than normalized as simply part of medical school.

Importantly, sleep education should not become another demand placed on already overwhelmed students. If the workload is structurally excessive, telling students to

manage their time better will not solve the problem. Institutional design and student behaviour have to be considered together.

11. Discussion

The evidence portrays sleep quality among medical students as a population-level wellbeing issue. More than half of students in large pooled analyses have been classified as having poor sleep quality, and the average sleep duration reported in the worldwide literature is shorter than the commonly recommended 7–9 hours for adults.

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At the same time, prevalence estimates should be interpreted carefully. Most studies rely on self-reported questionnaires and cross-sectional designs. A PSQI score identifies a pattern of poor sleep but does not by itself establish a specific sleep disorder or prove causality. Differences in culture, curriculum, academic calendars and assessment methods also make direct comparison between countries difficult.

Future research would benefit from longitudinal designs, objective measures such as actigraphy where appropriate, repeated assessment across examination and non-examination periods, and intervention studies. It would also be useful to examine whether changes in curriculum, clinical scheduling or institutional sleep-health programmes produce measurable improvements in student wellbeing and academic functioning.

12. Conclusion

Sleep quality is an important but often underestimated component of medical student health. The available literature shows that poor sleep is common and is associated with a complex mixture of academic pressure, clinical schedules, psychological distress, electronic-device use, lifestyle habits and irregular routines. Large meta-analyses suggest that roughly half of medical students experience poor sleep quality, while many report insufficient sleep or excessive daytime sleepiness.

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The central message is simple: sleep should not be treated as the leftover time after studying is finished. It is part of the process that makes learning, emotional regulation and safe professional development possible. A humanized approach recognizes that students are not machines that can exchange sleep for productivity indefinitely. Protecting sleep requires both individual habits and educational environments that make healthy sleep realistically achievable.

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