Original Research

Quality of sleep and its associated factors among medical undergraduates in Sri Lanka: a cross-sectional study

Manori Vijaya Kumari

Department of Physiology, Faculty of Medicine & Allied Sciences, Rajarata University of Sri Lanka

Correspondence: manoadikari@med.rjt.ac.lk https://orcid.org/0000-0001-6786-694X

DOI: https://doi.org/10.4038/jccpsl.v32i1.8865

Received on 14 Jul 2025
Accepted on 27 Jan 2026

Abstract

Introduction: Sleep is an important physiological process that plays a significant role in memory consolidation, critical thinking and decision-making. Disrupted sleep patterns can greatly diminish academic performance and potentially have long-term effects on professional development.

Objectives: To evaluate the quality of sleep and the factors associated with it among medical undergraduates in Sri Lanka

Methods: A cross-sectional survey involving 1496 medical undergraduates aged 18-29 years was conducted in two medical faculties in Sri Lanka. Participants completed the validated Pittsburgh Sleep Quality Index (PSQI) questionnaire to assess the quality of sleep. A total PSQI overall score of 5 or above was used to categorize those with poor quality of sleep.

Results: This study found that 71% of medical students reported experiencing poor sleep quality, with around 65% of participants across all academic years affected. Sleep duration was the most significantly affected domain of sleep quality as measured by PSQI, impacting 40% of participants. Students living in university indoor hostels reported significantly lower sleep quality (mean score=6.59) compared to those living at home (mean score=5.83; p=0.03). Additionally, participants who were overweight (mean score=6.92) reported significantly poorer sleep quality than those with normal body mass index (mean score=6.39; p=0.01) .

Conclusions & Recommendations: Poor quality of sleep is significantly prevalent among medical undergraduates, highlighting a need for an education-based program to enhance sleep quality and integrate related activities into their curriculum.

***Key words**: Sleep quality, Medical undergraduates, Medical education*

Introduction

Medical undergraduates often reduce their sleeping hours in order to manage their workload and dedicate more time to studying (1). The prevalence of poor quality of sleep varies among medical undergraduates in different nations, with 96% in Pakistan, 76% in Saudi Arabia, 36% in Nepal, 33% in India and 19% in China (1-5). The National Sleep Foundation recommends that young adults (aged between 18 to 25) get 7-9 hours of sleep per night (6). Many studies reported that poor general health and increased risk or presence of disease are associated with less than 7 hours of sleep compared to 7–8 hours of sleep (7).

An unorganized sleeping pattern is extremely common among medical undergraduates which can impair memory consolidation, learning ability, decision-making and critical thinking (8-9), all of which are crucial for academic performance and future careers as medical professionals. Studies have shown that poor sleep quality negatively correlates with academic performance (3, 10-11). In Sri Lanka, there is a lack of studies addressing the quality of sleep among medical undergraduates. Therefore, this study was designed to evaluate the prevalence of sleep quality and the associated factors among medical undergraduates in Sri Lanka.

Methods

A cross-sectional study was conducted in two medical facilities of state universities of Sri Lanka, The medical faculties in Sri Lanka offer a five-year degree programme classified into pre-clinical and clinical streams. Pre-clinical stream includes first and second academic years where medical students focus on acquiring theoretical knowledge in basic medical sciences. Following this, they enter the clinical stream, which spans the third, fourth and final academic years where they participate in clinical activities at teaching hospitals in addition to attending lectures to acquire further theoretical knowledge. In this study, medical undergraduates aged 18 -29 years of all five years participated.

The sample size was calculated using a study in India that reported a prevalence of poor sleep quality among medical undergraduates of 33% (4). Accordingly, the proportional value was considered as 0.3% and with a 20% non-respondent rate, the minimum required sample size was 402. However, considering higher non-response/incomplete response rates observed with Google Forms, it was decided to include the entire batch to enhance statistical power and to reduce sampling bias and ensure representativeness of the target population.

Students were approached at the end of their lectures or practical classes and all of them were enrolled for the study. They were informed that participation was completely voluntary and that they could withdraw from the study at any time with no effect on their academic activities. Participant information sheets were provided for students to read and they were given ample time to ask questions about the study. Informed written consent was obtained before the data collection. Data were collected using self-administered questionnaires that were distributed through an online platform (WhatsApp or email) via Google Sheets. As the MBBS curriculum is completely delivered in the English language and the students have a clear understanding of the medical terms, all parts of the questionnaires were administered in English. Further clarification was provided by the trained research assistants having medical knowledge if requested by any students.

The questionnaire consisted of socio-demographic factors and the Pittsburgh Sleep Quality Index (PSQI) questionnaire to evaluate the quality of sleep. It also included one question to identify any known psychiatric disorders. After the data collection, data set was screened to identify any response regarding psychiatric disorders and students with such disorders were excluded from the study. Data collection was carried out from September 2024 up to March 2025.

The Pittsburgh Sleep Quality Index (PSQI) questionnaire (12) has been validated among adult patients attending out-patient department (13) and among antenatal mothers and patients with chronic kidney disease (14). It comprises 19 items assessing sleep quality over the preceding month, specifically focusing on sleep duration, sleep latency, sleep disturbance, sleep efficiency, subjective sleep quality and usage of sleep medication. These items were categorized into seven component scores, each equally weighted on a scale of 0 to 3. The global PSQI score, which ranges from 0 to 21, is the sum of these seven component scores, with higher scores indicating poor quality of sleep. A total PSQI score of 5 or above was used to categorize those with poor quality of sleep (10). The prevalence of sleep was determined through descriptive statistical analyses. Stress scores were compared across different variables using one-way ANOVA and unpaired t-test.

Results

A total of 1505 medical undergraduates responded to the questionnaire (response rate of 92% in the first year, 91% in the second year, 71% in the third year, 65% in fourth year and 52% in the final year). After excluding nine participants with known psychiatric conditions (depression - 4, obsessive-compulsive disorder - 2, anxiety - 1, social anxiety - 1 and schizophrenia - 1), a total of 1496 participants were included in the final analysis. Of them, 66.3% were female (n=992) (Table 1). The participant age ranged from 18 to 29 years, with a mean age of 22.84 years (SD=2.0).

Table 1: Socio-demographic characteristics of medical undergraduates (N=1496)

Characteristics		No.	%
Age (years)	18 – 21	455	30.4
	22 – 25	857	57.3
	26 – 29	184	12.3
Gender	Male	504	33.7
	Female	992	66.3
Academic year	First year	379	25.3
	Second year	378	25.3
	Third year	297	19.9
	Fourth year	257	17.2
	Final year	185	12.4
Residence	Home	196	13.1
	Indoor hostel	710	47.5
	Outdoor hostels	590	39.4
Body composition	Underweight	257	17.2
	Normal	719	48.1
	Overweight	520	34.8

Most students reported their usual bedtime as being between 10 PM and 1 AM (87%; mean=10:20 PM), while their typical wake-up time was between 5 AM and 7 AM (82%; mean=5:48 AM). On average, it took them 27.6 minutes to fall asleep. Additionally, the majority of participants (80.2%) reported getting less than 7 hours of sleep each night. The global PSQI score among participants was 6.57 (SD=3.24) while 71% of them reported having poor quality of sleep. Approximately 65% of participants from each

academic year demonstrated poor sleep quality (Figure 1). When compared across different academic years, fourth-year students exhibited significantly poorer sleep quality than second-year students.

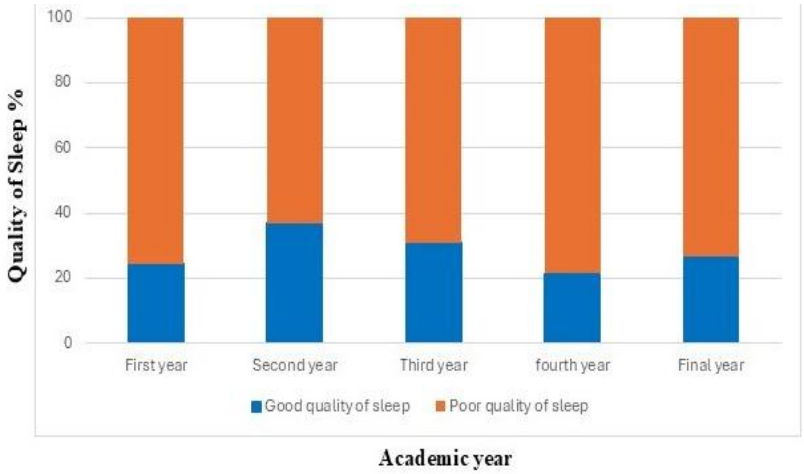

Figure 1: Distribution of the overall sleep quality across the academic years

With regards to scores obtained for individual domains of sleep quality, the highest average PSQI score was for sleep duration (score of 2.1), while the lowest was for habitual sleep efficiency (score of 0.21). Figure 2 illustrates the distribution of participants in relation to each sleep quality domain, ranging from 'no sleep problems' to 'severe sleep problem'.

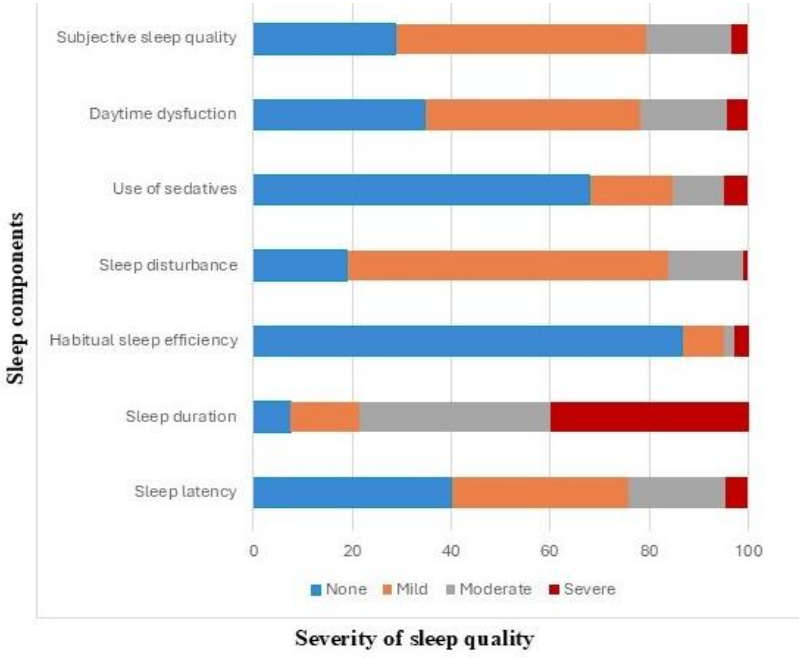

Figure 2: Distribution of the severity of sleep quality domains among medical undergraduates

The domain identified as severely problematic in this study was sleep duration affecting 40% of participants, while habitual sleep efficiency was the least impacted among the participants.

Students living in university indoor hostels reported significantly lower sleep quality (mean score=6.59) compared to those living at home (mean score=5.83; p=0.03). Additionally, participants who were overweight (mean score=6.92) reported significantly poorer sleep quality than those with normal BMI (mean score=6.39; p=0.01) (Table 2).

Table 2: Comparison of Pittsburgh Sleep Quality Index (PSQI) scores with socio-demographic characteristics of medical undergraduates

Characteristics		PSQI score Mean (SD)	Statistic	*p*-value*
Gender				
	Male	6.79 (3.2)	1.81	0.07
	Female	6.47 (3.2)		
Academic year				
	Fist year	6.75 (3.1)	3.25	**0.01**
	Second year	6.11 (3.2)		
	Third year	6.48 (3.3)		
	Fourth year	6.87 (3.1)		
	Final year	6.89 (3.3)		
Accommodation				
	Home	5.83 (3.3)	4.58	**0.03**
	Indoor hostel	6.59 (3.1)		
	Outdoor hostel	6.81 (3.2)		
Body composition				
	Normal	6.39 (3.2)	4.48	**0.01**
	Underweight	6.41 (3.2)		
	Overweight	6.92 (3.2)		
Actual hours of sleep				
	Less than 7 hours	7.15 (3.0)	14.77	**<0.01**
	7 hours or more	4.24 (2.7)		

*Unpaired t-test used for comparison of two groups; One-Way ANOVA used for comparison of multiple groups

Discussion

The results indicated that 71% of medical undergraduates experienced poor sleep quality. No statistically significant association was found with gender; however, university hostel students reported significantly lower sleep quality compared to those living at home. Furthermore, a higher BMI was significantly associated with poorer sleep quality. Sleep duration was the most problematic domain of the PSQI component affecting 40% participants, and shorter sleep duration was significantly associated with poor quality of sleep.

In comparison, a cross-sectional study conducted among medical undergraduates in Saudi Arabia found that 76% of them had poor sleep quality (1). Further research studies have highlighted sleep issues among medical students, with 33% of Indian medical undergraduates and 19% of Chinese medical undergraduates experiencing poor sleep quality, as measured by PSQI (4-5). This commonly observed practice in medical undergraduates is often a result of high academic pressure, irregular study schedules, and exam-related stress. Furthermore, factors such as anxiety and disrupted circadian rhythm can also contribute to sleep disturbances (15).

Consistent with the current study findings, a cross-sectional study in Nepal reported that medical undergraduates residing in hostels experience poorer sleep quality than those living at home (16). This difference may be attributed to late-night social gatherings in the hostels and increased participation in extracurricular activities (16). Furthermore, in the hostel facilities provided by government universities

in Sri Lanka, it is common for four students to share one room. This arrangement can disrupt individual sleep cycles due to noise disturbances, poor ventilation, and constant light in the room at night. Additionally, the hostel environment may offer less security for students.

In concurrence, previous studies have demonstrated a significant correlation between higher BMI and poorer sleep quality among university undergraduates (p=0.005) (17-18). This relationship could be attributed to activation of the hypothalamic-pituitary-adrenal (HPA) axis, which may lead to negative metabolic consequences (19). Sleep deprivation disrupts the normal circadian rhythm of cortisol, leading to elevated evening cortisol levels and a flattened diurnal slope (19).These changes can result in insulin resistance and increased fat accumulation (19). Additionally, poor sleep decreases levels of leptin (which helps regulate appetite) and increases levels of ghrelin (stimulates hunger) (19). This imbalance of hormones promotes appetite and overeating, contributing to obesity (19).

In healthy young adults, sleep influences memory consolidation, perceptual learning, REM-dependent procedural learning and acquisition of problem-solving skills (21-23). Rapid-eye-movement sleep (REM) supports procedural (skills) memory and emotional memory, while slow-wave sleep (SWS) facilitates declarative memory consolidation (24). In concurrence, the National Sleep Foundation recommends 7-9 hours of sleep per night for young adults (6, 20). However, sleep duration was the most adversely affected component of sleep quality among medical undergraduates (40%), with shorter sleep duration significantly associated with poor sleep quality. Studies have shown that poor sleep quality negatively correlates with academic performance (3, 10-11). Consequently, interventions aimed at improving sleep duration and sleep quality among medical undergraduates may potentially lead to improved academic outcomes. Therefore, integration of activities such as mindfulness meditation, time management training, and regular physical activity into the curriculum may improve the sleep quality of medical undergraduates (24-26).

This study possesses several strengths and limitations that warrant consideration. A key strength lies in the substantial sample size exceeding 1000 participants, coupled with the application of validated questionnaires. However, the inclusion of only two out of the twelve medical faculties in Sri Lanka represents a limitation, potentially impacting the generalizability of the results. Furthermore, this study could not rule out other organic disorders that may be linked to poor quality of sleep. Finally, the current study did not employ investigations such as polysomnography to accurately diagnose sleep disorders.

Conclusions & Recommendations

Poor quality of sleep is significantly prevalent among medical undergraduates, highlighting the need for an education-based programme to enhance sleep quality and integrate related activities into their curriculum.

Public Health Implications

- Findings of this study highlight the importance of addressing sleep quality as a key determinant of mental and physical well-being among medical students in Sri Lanka.
- As poor quality of sleep is highly prevalent among medical undergraduates, it is important to implement education-based programmes to enhance sleep quality and integrate related activities into their curriculum in medical faculties.
- By identifying the prevalence and contributing factors of poor sleep among medical undergraduates, this study provides valuable evidence to guide university administrations and policymakers in developing targeted interventions such as sleep hygiene education, counselling support, stress management and curriculum adjustments.

Author Declarations

Competing interests: The author declares no conflict of interest

Ethics approval and consent to participate: Ethical clearance was granted by the Ethics Review Committee of the Faculty of Medicine and Allied Science, Rajarata University of Sri Lanka (ERC/2024/60). Informed written consent was obtained from each participant prior to data collection.

Funding: Self-funded

Acknowledgements: All the medical undergraduates who enthusiastically participated in the study

Author contributions: MVK contributed to conceptualization, designing the study, project administration, fund acquisition, data collection, data visualization, data analysis, data interpretation and writing of the original draft.

References

1. Almojali AI, Almalki SA, Alothman AS, Masuadi EM, Alaqeel MK. The prevalence and association of stress with sleep quality among medical students. *J Epidemiol Glob Health* 2017; 7(3): 169-174. https://doi.org/10.1016/j.jegh.2017.04.005.
2. Abro SU, Khalid G, Saleem Q, Khan M, Ahmed S, Fathima. Association of body mass index and gender with sleep quality in medical students: A survey. *Prof Med J* 2020; 27(11): 2511-2516. https://doi.org/10.29309/TPMJ/2020.27.11.4717.
3. Paudel K, Adhikari TB, Khanal P, Bhatta R, Paudel R, Bhusal S, et al. Sleep quality and its correlates among undergraduate medical students in Nepal: A cross-sectional study. *PLOS Glob Public Health* 2022; 2(2): e0000012. https://doi.org/10.1371/journal.pgph.0000012.
4. Awasthi AA, Taneja N, Maheshwari S, Gupta T, Bhavika. Prevalence of internet addiction, poor sleep quality and depressive symptoms among medical students: a cross-sectional study. *Osong Public Health Res Perspect* 2020; 11(5): 303-308. https://doi.org/10.24171/j.phrp.2020.11.5.06.
5. Feng GS, Chen JW, Yang XZ. Study on the status and quality of sleep-related influencing factors in medical college students. *Zhonghua Liu Xing Bing Xue Za Zhi* 2005; 26(5): 328-331.
6. Hirshkowitz M, Whiton K, Albert SM, Alessi C, Bruni O, Doncarlos L, et al. National sleep foundation's sleep time duration recommendations: methodology and results summary. *Sleep Health* 2015; 1(1): 40-43. https://doi.org/10.1016/j.sleh.2014.12.010.
7. Watson NF, Badr MS, Belenky G, Bliwise DL, Buxton OM, Buysse D, et al. Joint consensus statement of the American Academy of Sleep Medicine and Sleep Research Society on the recommended amount of sleep for a healthy adult: methodology and discussion. *Sleep* 2015; 38(8): 1161-1183. https://doi.org/10.5665/sleep.4886.
8. Gupta S, Bhardwaj A, Nadda A, Gill A, Mittal A, Gupta S. A comparative study of sleep quality in different phases of the medical course: a study from Haryana (North India). *J Family Med Prim Care* 2020; 9(4): 2006.

https://doi.org/10.4103/jfmpc.jfmpc_1137_19.
9. Harrison Y & Horne JA. The impact of sleep deprivation on decision making: a review. *J Exp Psychol Appl* 2000; 6(3): 236-249. https://doi.org/10.1037//1076-898x.6.3.236.
10. Siddiqui AF, Al-Musa H, Al-Amri H, Al-Qahtani A, Al-Shahrani M, Al-Qahtani M. Sleep patterns and predictors of poor sleep quality among medical students in King Khalid University, Saudi Arabia. *Malays J Med Sci* 2016; 23(6): 94-102. https://doi.org/10.21315/mjms2016.23.6.10.
11. Chandran P, Kiran R, Nisha KM. The relationship between sleep quality and academic performance among undergraduate medical students: a cross sectional study. *J Acad Med Pharm* 2023; 5(5); 1151-1155. https://doi.org/10.47009/jamp.2023.5.5.226.
12. Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry Res* 1989; 28(2): 193-213. https://doi.org/10.1016/0165-1781(89)90047-4.
13. Anandakumar D, Dayabandara M, Ratnatunga SS, Hanwella R, de Silva VA. Validation of the sinhala version of the pittsburgh sleep quality index. *Ceylon Med J* 2025; 61(1): 22-25. https://doi.org/10.4038/cmj.v61i1.8255.
14. Jayasingha UC, Kumarage SW, Niroshani KSR, Pathirana GPWD, Witharana MIB, Fernando CA, et al. Quality of life, sleep quality and psychological wellbeing of patients with chronic kidney disease in Sabaragamuwa Province, Sri Lanka: a descriptive cross-sectional study. *Res Sq* 2025; 1; 1-26. https://doi.org/10.21203/rs.3.rs-7315035/v1.
15. Silva VM, Magalhaes JEM, Duarte LL. Quality of sleep and anxiety are related to circadian preference in university students. *PLoS One* 2020; 15(9): e0238514. https://doi.org/10.1371/journal.pone.0238514.
16. Sundas N, Ghimire S, Bhusal S, Pandey R, Rana K, Dixit H. Sleep quality among medical students of a tertiary care hospital: A descriptive cross-sectional study. *JNMA J Nepal Med Assoc* 2020; 58(222): 76-79. https://doi.org/10.31729/jnma.4813.
17. Wang J, Chen Y, Jin Y, Zhu L, Yao Y. Sleep quality is inversely related to body mass index among university students. *Rev Assoc Med Bras* 2019; 65(6); 845-850. https://doi.org/10.1590/1806-9282.65.6.845.
18. Pallavi P, Nataraj S, Gopi A, Ramachandra SC, Vishwanath P. Aspect of sleep quality amid undergraduate medical students in correlation with BMI. *Int J Heal Allied Sci* 2023; 11(4): 10. https://doi.org/10.55691/2278-344X.1054.
19. Ding C, Lim LL, Xu L, Kong APS. Sleep and obesity. *J Obes Metab Syndr* 2018; 27(1): 4. https://doi.org/10.7570/jomes.2018.27.1.4.
20. Stavitsky K, Neargarder S, Bogdanova Y, McNamara P, Cronin-Golomb A. The impact of sleep quality on cognitive functioning in parkinson's disease. *J Int Neuropsychol Soc* 2012; 18(1): 108-117. https://doi.org/10.1017/s1355617711001482.
21. Stickgold R, Hobson JA, Fosse R, Fosse M. Sleep, learning and dreams: off-line memory reprocessing. *Science* 2001; 294(5544): 1052-1057. https://doi.org/10.1126/science.1063530.
22. Smith C. Sleep states and memory processes in humans: procedural versus declarative memory systems. *Sleep Med Rev* 2001; 5(6): 491-506. https://doi.org/10.1053/smrv.2001.0164.
23. Goel N, Rao H, Durmer JS, Dinges DF. Neurocognitive consequences of sleep deprivation. *Semin Neurol* 2009; 29(4): 320-339. https://doi.org/10.1055/s-0029-1237117.
24. Diekelmann S, Wilhelm I, Born J. The whats and whens of sleep-dependent memory consolidation. *Sleep Med Rev* 2009; 13(5): 309-321. https://doi.org/10.1016/j.smrv.2008.08.002.
25. Marshall L & Born J. The contribution of sleep to hippocampus-dependent memory consolidation. *Trends Cogn Sci* 2007; 11(10): 442-450. https://doi.org/10.1016/j.tics.2007.09.001.
26. Fowler MJ, Sullivan MJ, Ekstrand BR. Sleep and memory. *Science* 1973; 179(4070): 302-304. https://doi.org/10.1126/science.179.4070.302.