ORIGINAL ARTICLE

Sleep quality among medical students during third wave of COVID-19 pandemic: A cross-sectional study in Government Medical College Jammu

Richa Mahajan[1], Rajiv K Gupta[2], Reeha Mahajan[3], Riya Gupta[4], Bhavna Langer[5], Rashmi Kumari[6]

[1,2,5,6]Department of Community Medicine, Government Medical College, Jammu
[3]Department of Anatomy, All India Institute of Medical Science, Jammu
[4]Department of Ophthalmology, Government Medical College, Jammu

CORRESPONDING AUTHOR
Dr Riya Gupta, Department of Ophthalmology, Government Medical College Jammu, Jammu and Kashmir 180001
Email: riyag9118@gmail.com

CITATION
Mahajan R, Gupta RK, Mahajan R, Gupta R, Langer B, Kumari R. Sleep quality among medical students during third wave of COVID-19 pandemic: A cross-sectional study in Government Medical College Jammu. Indian J Comm Health. 2024;36(3):386-392.
https://doi.org/10.47203/IJCH.2024.v36i03.009

ARTICLE CYCLE
Received: 27/01/2024; Accepted: 19/04/2024; Published: 30/06/2024

ABSTRACT

Background: COVID-19 has caused lot of suffering for everyone. Hundreds of thousands of people were affected in all aspects. Increased stress due to the pandemic may affect medical students' sleep quality. The authors aimed to evaluate the sleep quality of medical students during pandemic and relationship, if any, between sleep quality and and socio-demographic variables. **Methods:** An online survey of medical students was conducted in January 2022, when India was in third wave of pandemic. This cross-sectional study was conducted using the Pittsburgh Sleep Quality Index (PSQI) questionnaire at a tertiary teaching hospital in Jammu, UT, J&K, India. **Results:** Among 307 participants, mean global PSQI score was 9.91± 3.62 which indicated a poor quality of sleep. Among the component scores, habitual sleep efficiency had the highest score of 2.99± 0.16. Majority (91.53%) of the respondents had a poor sleep quality with global PSQI score >5. Among the socio-demographic variables, alcohol intake and any conflict in the family were found to be statistically significant ($p<0.05$). **Conclusion:** Nine out of ten medical students have insufficient sleep, which is a real cause for concern. The authors recommend that stress management (anxiety), lifestyle changes, and sleep training be included in the medical record and updated regularly.

KEYWORDS

COVID-19, Sleep Quality, Sleep Deprivation

INTRODUCTION

Sleep is an important physiological process for humans affecting physical and mental health and well-being.(1) The amount of sleep required by adults on an average is 8-10 hours.(2)

Lack of sleep slows down cognitive processes. (3) It is known that sleep has health benefits.(4) The most important is feeling of depth and peace felt upon waking after good sleep.(5)

The COVID-19 pandemic has led to major shift to online teaching, which has had impact on sleep patterns of students.(6) It is known that medical students are at greater risk of experiencing poor quality sleep due to their busy schedules.(7) In addition, stress increases with other determinants; For example, being home alone during the COVID-19 pandemic also increased sleep deprivation in medical students.(8) Inadequate sleep can affect learning, which can affect future work as a doctor.(9) A positive relationship has also been established between internet use and poor sleep by medical students during the COVID-19 pandemic.(10) Literature review shows that there are few studies on sleep quality among medical students in Jammu during the COVID-19 pandemic.

Aims and objectives:

1. To evaluate sleep quality of medical students during COVID-19 pandemic
2. To study relationship of various socio-demographic variables with sleep quality

Material & Methods

Study type and design- Online cross-sectional study

Study setting- Government Medical College Jammu

Study population- All undergraduate medical students of GMC Jammu.

Study duration- The online survey was conducted in January 2022, when the Google Form became available online.

Sample size and sampling method: A sample size of 267 was estimated assuming a prevalence of 50% poor sleep quality among undergraduate medical students, a confidence level of 95% and an allowable error of 6%. All the students of GMC Jammu were sent the link of the google forms so as to receive an adequate number of completed forms in order toachieve required sample size. Those who filled the forms were presumed to have given consent for participation in the study. A total of 355 forms were received out of which 48 forms were incomplete. So all the complete forms i.e. 307 forms were included in analysis.

Inclusion criteria- All undergraduate medical students were eligible for the study

Exclusion criteria- The forms which were incomplete were excluded from the purview of the study

Data collection tool: General information of the students regarding their age, gender, professional year, any conflict in family, screen time, alcohol consumption and smoking status was obtained using a self-designed questionnaire.

Pittsburgh Sleep Quality Index (PSQI) was used to collect data. The PSQI is a self-administered questionnaire that measures sleep quality and quality of sleep over a one-month period. Nineteen subjects received scores under seven headings: sleep quality during the day, sleep latency, sleep duration, sleep quality, sleep quality, use of sleeping pills and sleep quality. A total PSQI score greater than 5 indicates poor sleep quality. (11)

Data Collection: Informed consent was obtained through google forms from all participants after explaining the purpose of the study. The data collection was completely anonymous without any direct identifier data. The confidentiality of information and anonymity was assured to the participants.

The questionnaire was self-administered using Google forms to collect data. The questionnaire link was provided to the students included in the study. The Email ID of the respondents was used as a unique identifying field to avoid multiple submissions. The form included an initial section providing information regarding the research study and gave the participant a choice of making an informed decision to participate.

Ethical approval- Approval was obtained from Institutional Ethics Committee before commencement of the study.

Statistical analysis: The data collected from the respondents in the Google Spreadsheet was initially checked for completeness and data was cleaned for errors. The corrected data was exported into MS Excel spreadsheets and categorized as well as tabulated using Microsoft Excel (version 2009). Statistical analysis was performed using SPSS version 20.0.

RESULTS

The mean Global PSQI score of the study participants was 9.91± 3.62, which indicates poor overall sleep quality. Among the various components, highest score of 2.99± 0.16 was observed for component 4 i.e. habitual sleep efficiency (Table 1).

Habitual sleep efficiency (%) = (No. of hours slept/ No. of hours spent in bed) X100

TABLE 1 PSQI total and component scores

S.No.	PSQI components	Mean ± SD
Component 1	Subjective sleep quality	1.27 ± 0.92
Component 2	Sleep latency	1.37 ± 1.02
Component 3	Sleep duration	1.55 ± 1.24
Component 4	Habitual sleep efficiency	2.99 ± 0.16
Component 5	Sleep disturbances	1.23 ± 0.67
Component 6	Use of sleeping medication	0.18 ± 0.59
Component 7	Daytime dysfunction	1.31 ± 0.93
Total	Global PSQI score	9.91 ± 3.62

91.53% of the undergraduate students had a sleep quality average of more than 5 (Table 2). The mean age of students was 20.94±1.62. Only 14% students reported that they consume alcohol while 30.6% were smokers. 71% of the undergraduate students spent >2 hours on mobile/laptop. Exposure to alcohol and stress in the family was found to be significantly associated with poor sleep quality ($p < 0.05$) [Table 3].

Table 2 PSQI score averages of the sample

Global PSQI score	n	%
5 and below	26	8.47
Above 5	281	91.53

Table 3: Association of possible risk factors with Global PSQI score

S.No.		Global PSQI score ≤5	Global PSQI score >5	Odd's ratio	Chi-square	p value
1.	Gender					
	Male	9	119	0.72	0.58	0.44
	Female	17	162			
2.	Professional year					
	1st year	6	78			
	2nd year	3	68	-	5.14	0.16
	3rd year	8	84			
	4th year	9	51			
3.	Alcoholic					
	Yes	11	32	5.71	18.89	0.00
	No	15	249			
4.	Smoker					
	Yes	9	85	1.22	0.21	0.64
	No	17	196			
5.	Time spent on mobile/laptop/internet				0.44	0.51
	≤ 2 hours	9	80	1.33		
	>2 hours	17	201			
6.	Any conflict in family					
	Yes	15	34	9.91	36.88	<0.0000001
	No	11	247			

Only 30 students out of 307 (9.77%)had sleep latency of >60 minutes while about 45.9%of the students had a sleep latency of ≤15 minutes. 36.1% of the students reported <5 hours of sleep while 28.3% had sleep duration of >7 hours. 71.3% of the students had habitual sleep efficiency of >85% while 5.5% had<65%. 8 students out of 307 (2.6%) reported use of sleeping medication three or more times a week during the past month while 89.5% had not used any sleeping medication during the past month. 57.9% students reported that they did not have any trouble staying awake while driving, eating meals or engaging in social activities while 11.7% reported such problems three or more times in a week (Table 4, Figure 1).

For ease of illustration, the mean global and components' scores were converted to percentages (the global PSQI and subcomponent scores were divided by their maximum possible values, i.e., 21 for the global PSQI score and 3 for the component score. The result was multiplied by 100 to produce the percentage. The higher the value, the worse is the quality of sleep (Figure. 2).

Table 4: Sleep quality and its component scores among undergraduate medical students

COMPONENTS	FREQUENCY	PERCENT
Subjective sleep quality		
Very good	61	19.87
Fairly good	139	45.28
Fairly bad	69	22.47
Very bad	38	12.38
Sleep latency		
0	70	22.80
1	105	34.20
2	79	25.73
3	53	17.26
Sleep duration		
0	87	28.34
1	74	24.10
2	35	11.40
3	111	36.16
Habitual sleep efficiency		
0	219	71.33
1	49	15.96
2	22	7.17
3	17	5.54
Sleep disturbance		
0	30	9.77
1	186	60.59
2	80	26.06
3	11	3.58
Use of sleeping medication		
Not during the past month	275	89.58
Less than once a week	15	4.88
Once or twice a week	9	2.93
Three or more times a week	8	2.60
Daytime dysfunction		
0	62	20.19
1	127	41.37
2	80	26.06
3	38	12.38

Figure 1 PSQI total and component scores for all participants and among good and poor sleepers

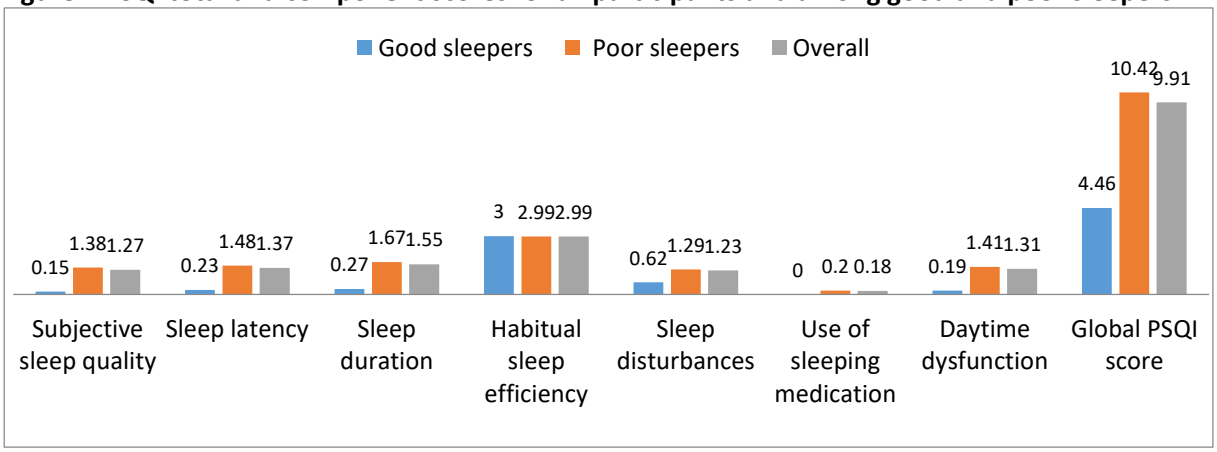
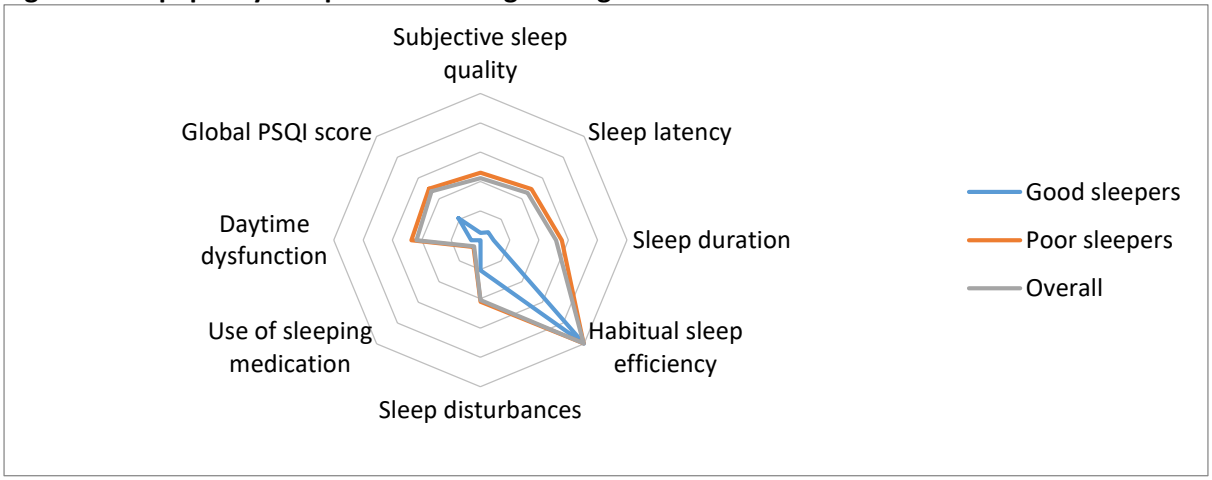


Figure 2 Sleep quality and patterns among undergraduate medical students of GMC Jammu



DISCUSSION

The results of this study showed that approximately 35% of medical school students experienced sleep disorders during the COVID-19 epidemic, which is not a good situation. In contrast, Saguem et al reported a high rate of poor sleep (72.5%) among medical students during the COVID-19 quarantine period.(12)Higher rates were also reported by Basu et al(13) and from Ethiopia(14) as well as from Saudi Arabia.(15) Mishra et al(16) reported 45% undergraduate medical students had poor quality sleep which was consistent with the results reported from Kathmandu Medical College students.(17) The current results are in consonance with those reported by Goyal et al.(18) Different results may be due to different methods, different educational environments, different cultural practices, and different learning difficulties of medical students.

The study found that variables such as alcohol consumption and family conflict were significantly associated with poor sleep ($p<0.05$). Tahir et al 19 reported that residence, health, symptoms associated with COVID-19, living with a person infected with COVID-19, and excessive internet use were important factors of poor sleep. Wondie et al reported that the rate of poor sleep among Ethiopian UG medical students was 62% and that factors such as depression, lack of support, and anxiety were associated with poor sleep quality ($p<0.05$).(14) Attal et al from Yemen reported 68% of medical students as poor sleepers and among the causes, stress and academic work load were the most commonly reported.(20)

Results have further revealed that majority of the medical students were spending more time on screen (mobile, laptop, internet, etc.) though it was not statistically significant ($p>0.05$). These results are in agreement with those reported by Mishra et al(16) and Natarajan et al.(21) Other authors have also

reported the negative effects of screen time on sleep quality.(22,23,24) This may be due to poor timing; Spending too much time in front of a screen can lead to poor sleep. Use it for other activities, such as physical exercise, that will help you sleep better.(25) Additionally, screen time increases exposure to blue light, which further affects sleep quality by reducing melatonin production at night.91.5% of the respondents had poor sleep quality in the present study (PSQI global score >5) and these results are in contrast to the results reported from Nepalese medical students where this rate was 30.36%(26) and Indian medical students at 34.6%.(27)

Only 2.6% of the respondents were reported to be using the sleeping pills three or more times a week whereas 10.2% of Saudi Arabian physicians used sleeping pills once or twice a week during the COVID-19 pandemic.(28) Shrestha et al reported that none of the participants had to take medication to help them sleep.(26)Kwon M reported that factors affecting sleep quality of college students during COVID-19 pandemic were health status, intolerance of uncertainty and fear of COVID-19.(29)

Conclusion

The present study has revealed 91.5% of the respondents to be as poor quality sleepers which is indeed a worrisome matter as it is going to have a long term impact on mental health of medical students. It is hoped that with COVID-19 pandemic receding in India, the high rate of poor quality sleepers would come down in future.

Recommendation

The study reveals that sleep quality of undergraduate medical students has been affected due to COVID-19 pandemic and thus authors suggest stress management techniques to be included in the medical curriculum.

Limitation of the Study

Since authors provided self-reporting questionnaire, information bias is a major risk in the current study. Since the study was conducted in a single medical school, the results would lack generalizability. Other limitations include recall bias and subjectivity bias. Also, gender-wise sleep quality could not be ascertained.

Relevance of the Study

The authors studied the sleeping pattern of undergraduate students during third wave of COVID-19 pandemic. The evidence generated has shown that sleep quality of majority of the students has been affected which need appropriate action and further follow-up.

Authors Contribution

All authors have contributed equally.

Financial Support and Sponsorship

Nil

Conflict of Interest

There are no conflicts of interest.

Declaration of Generative AI and AI Assisted Technologies in the Writing Process

The authors haven't used any generative AI/AI assisted technologies in the writing process.

References

1. Ranasinghe AN, Gayathri R, Vishnu PV. Awareness of effects of sleep deprivation among college students. Drug Invention Today. 2018;10(9). 1806-1809
2. Gautam P, Dahal M, Baral K, Acharya R, Khanal S, Kasaju A, Sangroula RK, Gautam KR, Pathak K, Neupane A. Sleep Quality and Its Correlates among Adolescents of Western Nepal: A Population-Based Study. Sleep Disord. 2021 May 16;2021:5590715
3. Al-Khani AM, Sarhandi MI, Zaghloul MS, Ewid M, Saquib N. A cross-sectional survey on sleep quality, mental health, and academic performance among medical students in Saudi Arabia. BMC Res Notes.2019;12:665.
4. Lavie P, Pillar G, Malhotra A. Sleep disorders: Diagnosis, management & treatment, A hand book for clinicians. London: Martin Dunitz Ltd; 2002.
5. Buysse DJ, Reynolds CF, Timothy HM, Susan RB, David JK. The Pittsburgh sleep quality index: a new instrument for psychiatric practice and research. Psych Res 1988;28(2):193–213.
6. Meo SA, Alkhalifah JM, Alshammari NF, Alnufaie WS, Algoblan AF. Impact of COVID-19 pandemic on sleep quality among medical and general science students: King Saud University Experience. Pak J Med Sci. 2022 Mar-Apr;38(3Part-I):639-644.
7. Corrêa C de C, Oliveira F K de, Pizzamiglio D S, Ortolan E V P, Weber SAT. Sleep Quality in Medical Students: A Comparison Across the Various Phases

of the Medical Course. JornalBrasileiro de Pneumologia. 2017;43(4):285–89.
8. Saguem BN, Nakhli J, Romdhane I, Nasr SB. Predictors of sleep quality in medical students during COVID-19 confinement. Encephale. 2022;48(1):3-12.
9. Saat NZM, Hanawi SA, Chan KS, Hanafiah H, Teh SC, Aznan SR, et al. Sleep Quality among University students: Associations between Demographic Factors and Physical Activity level. Int.J. Pharm. Res. Allied Sci.2020;9(3):57-65.
10. Tahir MJ, Malik NI, Ullah I, Khan HR, Perveen S, Ramalho R, Siddiqi AR, Waheed S, Shalaby MMM, et al. Internet addiction and sleep quality among medical students during the COVID-19 pandemic: A multinational cross-sectional survey. PLoS One. 2021 Nov 5;16(11):e0259594.
11. 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. May 1989;28(2):193-213.
12. Saguem BN, Nakhli J, Romdhane I, Nasr SB. Predictors of sleep quality in medical students during COVID-19 confinement. Encephale. 2022 Feb;48(1):3-12
13. Basu M, Saha SK, Majumder S, Chatterjee S, Misra R. A study on sleeping pattern among undergraduate medical students of a tertiary care teaching hospital of Kolkata. Int J Med Publ Health. 2019;9(4):118–124.
14. Wondie T, Molla A, Mulat H, et al. Magnitude and correlates of sleep quality among undergraduate medical students in Ethiopia: cross –sectional study. Sleep SciPract. 2021;5(7):1-8.
15. NK I, FA B, YM M, et al. Sleep quality among medical students at king Abdulaziz university: a cross-sectional study. J Community Med Health Educ. 2017;7(5).
16. Mishra J, Panigrahi A, Samanta P, Dash K, Mahapatra P, Behera MR. Sleep quality and associated factors among undergraduate medical students during COVID-19 confinement. Clinical Epidemiology and Global Health.2022;15. https://doi.org/10.1016/j.cegh.2022.101004.
17. 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. J Nepal Med Assoc JNMA. 2020;58(222):76–79. https://doi.org/10.31729/ jnma.4813.
18. Goyal N, Gupta SK. Sleep quality among medical students. Int J Community Med Public Heal. 2020;7(1):274–278. https://doi.org/10.1016/j.eurpsy.2016.01.2216.
19. Tahir MJ, Malik NI, Ullah I, Khan HR, Perveen S, Ramalho R et al. Internet addiction and sleep quality among medical students during the COVID-19 pandemic: A multinational cross-sectional survey. Plos One. 2021;16(11). https://doi.org/10.1371/journal.pone.0259594.
20. Attal BA, Bezdan M, Abdulqader A. Quality of Sleep and its Correlates among Yemeni Medical Students: A Cross-Sectional Study. Hindawi Sleep Disorders. 2021;1-10. https://doi.org/10.1155/2021/8887870.
21. Natarajan A, Kanagamuthu R, Reddy MS, Sindhuja AS. Assessment of influence of screen time on quality of sleep among dental students. Ann Int Med Dent Res. 2020;6 (5):1–4. https://doi.org/10.21276/aimdr.2020.6.5.PH1.
22. Ma C, Zhou L, Xu W, Ma S, Wang Y. Associations of physical activity and screen time with suboptimal health status and sleep quality among Chinese college freshmen: a cross-sectional study. PLoS One. 2020;15. https://doi.org/10.1371/journal.pone.0239429.
23. Wu X, Tao S, Zhang Y, Zhang S, Tao F. Low physical activity and high screen time can increase the risks of mental health problems and poor sleep quality among Chinese college students. PLoS One. 2015;10(3). https://doi.org/10.1371/journal.pone.0119607.
24. Foerster M, Henneke A, Chetty-Mhlanga S, R¨o¨osli M. Impact of adolescents' screen time and nocturnal mobile phone-related awakenings on sleep and general health symptoms: a prospective cohort study. Int J Environ Res Publ Health. 2019;16(518). https://doi.org/10.3390/ijerph16030518.
25. Magee CA, Lee JK, Vella SA. Bidirectional relationships between sleep duration and screen time in early childhood. JAMA Pediatr. 2014;168(5):465–470. https://doi.org/10.1001/jamapediatrics.2013.4183.
26. Shrestha D, Adhikari SP, Rawal N, Budhathoki P, Pokharel S, Adhikari Y et al. Sleep quality among undergraduate students of a medical college in Nepal during COVID-19 pandemic: an online survey [version 2, peer review, 2 approved]. F1000 Research. 2021;10:505. https://doi.org/10.12688/f1000research.53904.2.
27. Saraswathi I, Saikarthik J, Kumar KS, et al.: Impact of COVID-19 outbreak on the mental health status of undergraduate medical students in a COVID-19 treating medical college: A prospective longitudinal study. PeerJ. 2020 Oct 16; 8.
28. Alnofaiey YH, Alshehri HA, Alosaimi MM, et al.: Sleep disturbances among physicians during COVID-19 pandemic. BMC Res Notes. 2020 Dec 1; 13(1): 1–7.
29. Kwon M, Oh J. Factors Affecting Sleep Quality Of College Students During Coronavirus Disease 2019 Pandemic: A Cross-Sectional Study. Medicina 2023, 59(2), 416; https://doi.org/10.3390/medicina59020416