

Assessment of Sleep Quality among Medical Students During the Covid-19 Pandemic

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ABSTRACT

Objective: To assess the sleep quality among medical students, comparing their sleep cycles during physical and online studies along with other factors associated with sleep patterns.

Study Design: Cross-sectional Questionnaire based survey

Place and Duration of Study: Department of Community Medicine, HITEC Institute of Medical Sciences Taxila from 1st January 2020 to 31st March 2020

Methodology: One hundred and forty seven students were surveyed in a time period of 1 month. The questionnaire included PSQI Pittsburgh Sleep Quality Index and other clinically validated questions. Students with known sleeping disorders were excluded from this survey.

Results: There were 81 (55.1%) females and 65 (44.2%) males with mean age 20±1.4 years. Out of these 94(63.9%) were classified as "Poor Sleepers" and only 53 (36.1%) were "Good Sleepers". Poor sleep quality was associated with female gender ($p<0.05$), day-scholar residence status ($p<0.054$), excessive time required to sleep ($p<0.00$), excessive screen time usage ($p<0.007$), increased hours of study ($p<0.089$), experiencing trouble while driving, eating and socializing ($p<0.002$), lack of enthusiasm ($p<0.000$), unsatisfactory daily activities ($p<0.000$) and poor daytime alertness levels ($p<0.360$). 104 (70.7%) were aware of the effects of melatonin on sleep, only 51 (34.7%) admitted to have used coffee to stay awake at night. 98 (66.7%) subjects were pre-exam workers, 95 (64.6%) admitted not being able to wake up easily in the morning.

Conclusion: The students and hostelites that used less screen time slept better. Excessive daytime tiredness was also a result of poor sleeping habits. Students who studied for longer periods of time and had difficulty waking up in the morning slept poorly. Poor sleepers also find it difficult to interact and are often unambitious about performing their daily mental tasks, as well as displeased with their daily activities. As a matter of fact, we deduce that sleep quality has unanticipated consequences for medical students' social and mental health.

Keywords: Sleep Quality, Medical Student, Online Classes, PSQI, Excessive Daytime sleepiness, Epworth sleepiness scale

INTRODUCTION

Good quality sleep is imperative for both physical and mental wellbeing.¹ However, lifestyle and environmental factors are increasingly causing difficulties in sleeping.² Decreased subjective sleep quality has become one of the most prevalent health issues among adults.³ Medical students are no exception to the above fact. They are very prone to sleep deprivation due to a tremendous amount of stress from both theoretical and clinical knowledge as well as the tiresome schedule they have to follow leading to physical as well as psychological distress.⁴ In an attempt to contend with their task load and demanding surroundings, they frequently cut back on their sleep.⁵ Their sleeping habits are composed of short sleep intervals, postponed sleep onsets, and the incidence of daytime naps.⁶

If we intend to enhance medical students' lives in general, including their academic performance, a greater knowledge of the genesis of sleep issues is fundamental.⁷

Symptoms of anxiety and depression were also observed in research conducted among Estonian medical students with sleep problems.⁸ Prevalence of Excessive Daytime Sleeping (EDS) was also observed among medical students.⁹ Additionally sleep issues have been linked in a substantial way to poorer academic achievements.¹⁰

Numerous factors, including social and academic obligations, part-time employment, and erratic school schedules, may impact adolescents' sleep-wake cycles, according to surveys and experimental research.¹¹ Melatonin is an important factor of sleep regulation via Circadian Rhythm. An association between emissions from mobile phones that emits extremely low frequency (ELF) and its effect on melatonin secretions in medical students has also been observed.¹² Poor sleep quality is well recognized to be correlated with a variety of disciplinary and lifestyle problems, including cigarette smoking, binge drinking, insufficient physical activity, and using the internet excessively.¹³

MATERIALS AND METHODS

This cross-sectional study was carried out among MBBS and BDS students of HITEC-IMS Taxila from 1st January 2020 to 31st March

2020. A total of 147 students were surveyed. Prior approval from the Ethical Review Board, HITEC Institute of Medical Sciences was sought before data was collected on Google forms. Convenient non-probability sampling was done, all participants were briefed beforehand regarding the incentive of the study, and confidentiality was ensured throughout the process. Incomplete surveys, females who were pregnant or nursing, students with a background of sleep disorders (insomnia, parasomnia, and obstructive sleep apnoea), and students unable to comprehend or contemplate English were excluded. The questionnaire dispensed on Google Forms included PSQI Pittsburgh Sleep Quality Index and other clinically validated questions.

The PSQI serves to distinguish between normal and poor sleepers, the PSQI is made of 19 stem questions, the scores of which are summed up; a score greater than 5 is consistent with poor sleep parameter. The PSQI has an 89.6% diagnostic sensitivity and 86.5% specificity.⁸ The data was analysed using SPSS-22. Chi-square test was applied and $p<0.05$ considered as significant.

RESULTS

There were 81 (55.8%) females and 65 (44.2%) males (Fig. 1). Overall mean age was 20±1.4 years. Ninety four (63.9%) were classified as "Poor Sleepers" and only 53 (36.1%) were "Good Sleepers". Female gender was associated with poor sleep quality ($p<0.05$), day-scholar residence status ($p<0.054$), the excessive time required to sleep ($p<0.00$), excessive screen time usage ($p<0.007$), increased hours of study ($p<0.089$), experiencing trouble while driving, eating and socializing ($p<0.002$), lack of enthusiasm ($p<0.000$), unsatisfactory daily activities ($p<0.000$) and poor daytime alertness levels ($p<0.360$). 104 (70.7%) were aware of the effects of melatonin on sleep, only 51 (34.7%) admitted to having used coffee to stay awake at night. Students with poor sleep had an increased mean total sleep time ($p<0.000$). Also, these students with poor sleep quality had subjective experiences ($p<0.000$) [Tables 1-2).

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subjective experiences ($p < 0.000$). Sleep disturbances were compared among the Good Sleepers and Bad Sleepers (Table 3). There was a significant difference between them. Among these disturbances experienced by the bad sleepers were not being able to fall asleep within 30 minutes in bed ($p < 0.000$), awakening up early in the morning or during the night ($p < 0.000$) and not being able to breathe comfortably ($p < 0.000$).

Students with bad sleep mostly preferred studying at night (Table 4). These mainly were those students who were pre-exam workers rather than those students who worked daily (Table 5). Moreover, the poor sleepers found it difficult to wake up early in the morning (Table 6).

Table 1: Percentage of "Poor Sleepers" within subject population correlations

Female Gender	61.7%
Day Scholars	71.8%
Excessive time required to sleep	97.8%
Excessive screen time usage	73.3%
Increased Study time	78.3%
Trouble while driving, eating, socializing	47.9%
Lack of enthusiasm	65.1%
Unsatisfactory daily activities	93.3%
Poor daytime alertness (asleep)	66.7%

Table 2: PSQI scores compared among Good Sleepers and Bad Sleepers using p-values

Variable	Good Sleepers	Bad Sleepers	p-value
Mean PSQI Scores	3.4259	10.8511	.000
Mean total sleep time PSQI score	0.20	1.10	.000
Subjective Sleep quality	0.39	1.51	.000
Mean daytime alertness (during online lectures)	4.06	4.62	.131

Table 3: Sleep disturbance compared using p-values between those labelled as Good Sleepers or Bad Sleepers

Sleep disturbances (three or more times a week)	Good Sleepers	Bad Sleepers	p-value
Cannot get to sleep within 30 minutes	1 (2%)	50 (98%)	.000
Wake up in the middle of the night or early morning	3 (8.3%)	33 (91.7%)	.000
Have to get up to use the bathroom	3 (21.4%)	11 (78.6%)	.080
Cannot breathe comfortably	-	8 (100%)	.000
Cough or snore loudly	2 (28.6%)	5 (71.4%)	.162
Feel too cold	1 (5.3%)	18 (94.7%)	.002
Feel too hot	-	6 (100%)	.108
Have bad dreams	5 (20%)	20 (80%)	.018
Have pain	1 (8.3%)	11 (91.7%)	.006
Use of Sleep Medications	-	3 (100%)	.111

Table 4: Comparison of the study habits of Good Sleepers and Bad Sleepers

Do you prefer to study at night?	Good Sleepers	Bad Sleepers
Yes	25 (32.1%)	53 (67.9%)
No	27 (39.7%)	41 (60.3%)

Table 5: Comparison of the working habits of Good Sleepers and Bad Sleepers

Worker Type	Good Sleepers	Bad Sleepers
Daily worker/Pre-exam worker	17 (36.2%)	30 (63.8%)
Pre Exam worker	34 (34.7%)	64 (65.3%)

Table 6: Early morning wakefulness compared between Good Sleepers and Bad Sleepers

Do you find it easy to wake up early in the morning?	Good Sleepers	Bad Sleepers
Yes	20 (39.2%)	31 (60.8%)
No	32 (33.7%)	63 (66.3%)

DISCUSSION

The study assessed the sleep quality of medical students during the Covid-19 pandemic. The authors decided to apply PSQI as the instrument to assess sleep quality as it shows good predictive value in the previous study.¹⁴ The results from our survey of 147 students at HITEC-IMS, Taxila supported the expected hypothesis. The findings showed a significant percentage of poor sleepers (63.6%) over good sleepers (36.0%). Poor sleep quality was associated with female gender, day-scholar residence status, the

excessive time required to sleep, excessive screen time usage, increased hours of study, experiencing trouble while driving, eating and socializing, lack of enthusiasm, unsatisfactory daily activities, and poor daytime alertness levels.

The interrelation between poor sleep quality and female gender can be explained in part by the increase in the frequency of various sleep disorders among women.¹⁵ Home confinement, female gender, and sleep disordered-breathing SDB were associated with sleep problems.¹⁶ Excessive screen exposure was associated with poor psychosocial well-being and decreased mean sleep time.¹⁷ Students are increasingly likely to sacrifice sleep time for studying in the latter years of high school; this negative dynamic becomes increasingly prevalent over time.¹⁸ Increased prevalence of poor sleep in our study can be traced back to online academic schedule, Covid-19 pandemic lockdown, the study stresses during the pandemic, and certain respiratory disorders.

A study conducted among medical students of Karachi, Pakistan said that 36.6% of participants were considered to have abnormal sleep habits, with a statistically significant increase in female students.¹⁹ In 2 different studies conducted in Lahore, Pakistan significant percentage of students had poor sleep hygiene.^{20,21}

In a study in the United Kingdom, 24% of university students reported that they have difficulty in going to sleep and slept less than 7 hours per night, and 45% complained that they were unable to wake up properly.²² In a Moroccan study one third of medical students present with an excessive daytime sleepiness; 58.2% reported disturbed sleep and 86.4% presented tendency toward high levels of psychological distress.²³ A study conducted in Malaysia revealed 41.8% of the medical students had poor quality of sleep.²⁴ Similarly, poor quality of sleep was seen in the students of Lebanon (52.7%), Colombia (79.3%) and Taiwan.²⁵⁻²⁷

Some limitations need to be addressed. First, the reported sleep quality was subjective and not objectively measured. Second, all the subjects were medical students thus these results cannot be extrapolated to the general population's sleep quality. Also, students with disabilities or diseases were excluded so their effect on sleep cannot be addressed.

CONCLUSION

The significant numbers of medical students have low sleep quality which may affect their academic performance also a grim study routine has a significant association with poor sleep quality and may have a long-term impact on their health. Efforts should be directed to the teaching of sleep hygiene and time management skills should be part of the academic curriculum. As also special care must be taken in regards to female gender sleep quality as it is at more risk.

REFERENCES

1. Lowe CJ, Safati A, Hall PA. The neurocognitive consequences of sleep restriction: a meta-analytic review. *Neurosci Biobehav Rev* 2017; 80:586–604.
2. WHO technical meeting on sleep and health: Bonn Germany, 22–24 January 2004 [Internet]. [cited 2022 Dec 8]. Available from: <https://apps.who.int/iris/handle/10665/349782>
3. van Cauter E, Leproult R, Plat L. Age-related changes in slow wave sleep and REM sleep and relationship with growth hormone and cortisol levels in healthy men. *JAMA* 2000;284(7):861-8.
4. Sleep Disruption and its Correlation to Psychological Distress Among Medical Students | Shiraz E-Medical Journal | Full Text [Internet]. [cited 2022 Dec 8]. Available from: <https://brieflands.com/articles/semj-78485.html>
5. Almojali AI, Almalki SA, Allothman AS, Masuadi EM, Alaqeel MK. The prevalence and association of stress with sleep quality among medical students. *J Epidemiol Glob Health* 2017; 7(3):169-74.
6. Abdulghani HM, Alrowais NA, Bin-Saad NS, Al-Subaie NM, Haji AMA, Alhaqwi AI. Sleep disorder among medical students: Relationship to their academic performance. *Med Teach* 2012;34(Suppl 1).

7. Azad MC, Fraser K, Rumana N, Abdullah AF, Shahana N, Hanly PJ, et al. Sleep disturbances among medical students: a global perspective. *J Clin Sleep Med* 2015;11(1):69-74.
8. Eller T, Aluoja A, Vasar V, Veldi M. Symptoms of anxiety and depression in Estonian medical students with sleep problems. *Depress Anxiety* 2006;23(4):250-6.
9. Ramamoorthy S, Mohandas M, Sembulingam P, Swaminathan VR. Prevalence of excessive daytime sleepiness (EDS) among medical students. *World J Pharmaceut Res* 2014; 3.
10. Abdulghani HM, Alrowais NA, Bin-Saad NS, Al-Subaie NM, Haji AMA, Alhaqwi AI. Sleep disorder among medical students: Relationship to their academic performance. *Med Teach* 2012; 34(Suppl 1).
11. Medeiros ALD, Mendes DBF, Lima PF, Araujo JF. The relationships between sleep-wake cycle and academic performance in medical students. 2010;32(2):263-70.
12. Abdulghani HM, Alrowais NA, Bin-Saad NS, Al-Subaie NM, Haji AMA, Alhaqwi AI. Sleep disorder among medical students: relationship to their academic performance. *Med Teach* 2012;34(Suppl 1):S37-41.
13. Cheng SH, Shih CC, Lee IH, Hou YW, Chen KC, Chen KT, et al. A study on the sleep quality of incoming university students. *Psychiatry Res* 2012; 197(3):270-4.
14. 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.
15. James BO, Omoaregba JO. Prevalence and correlates of poor sleep quality among medical students at a Nigerian university. *Ann Afr Med* 2011; 5(1): 1-5.
16. Klink M, Quan SF. Prevalence of reported sleep disturbances in a general adult population and their relationship to obstructive airways diseases. *Chest* 1987;91(4):540-6.
17. Pinto J, van Zeller M, Amorim P, Pimentel A, Dantas P, Eusébio E, et al. Sleep quality in times of Covid-19 pandemic. *Sleep Med* 2020; 74:81-5.
18. Zhao J, Zhang Y, Jiang F, Ip P, Ho FKW, Zhang Y, et al. Excessive screen time and psychosocial well-being: the mediating role of body mass index, sleep duration, and parent-child interaction. *J Pediatr* 2018;202:157-62.
19. Surani AA, Zahid S, Surani A, Ali S, Mubeen M, Khan RH. Sleep quality among medical students of Karachi, Pakistan. *J Pak Med Assoc* 2015; 65(4): 380-2.
20. Waqas A, Khan S, Sharif W, Khalid U, Ali A. Association of academic stress with sleeping difficulties in medical students of a Pakistani medical school: a cross sectional survey. *Peer J* 2015;3:e840.
21. Shah M, Hasan S, Malik S, Sreeramareddy CT. Perceived stress, sources and severity of stress among medical undergraduates in a Pakistani medical school. *BMC Med Educ* 2010;10(1):1-8.
22. Webb E, Ashton CH, Kelly P, Kamali F. Alcohol and drug use in UK university students. *Lancet* 1996;348(9032):922-5.
23. el Hangouche AJ, Jniene A, Abouddrar S, Errguig L, Rkain H, Cherti M, et al. Relationship between poor quality sleep, excessive daytime sleepiness and low academic performance in medical students. *Adv Med Educ Pract* 2018;9:631.
24. Zailinawati AH, Teng CI, Chung YC, Teow TL, Lee PN, Jagmohni KS. Daytime sleepiness and sleep quality among Malaysian medical students. *Med J Malaysia* 2009; 64(2): 108-10.
25. Assaad S, Costanian C, Haddad G, Tannous F. Sleep patterns and disorders among university students in Lebanon. *J Res Health Sci* 2014; 14(3): 198-204.
26. MacHado-Duque ME, Echeverri Chabur JE, MacHado-Alba JE. Excessive daytime sleepiness, poor quality sleep, and low academic performance in medical students. *Rev Colomb Psiquiatr* 2015;44(3):137-42.
27. Kang JH, Chen SC. Effects of an irregular bedtime schedule on sleep quality, daytime sleepiness, and fatigue among university students in Taiwan. *BMC Public Health* 2009; 9(1):1-6.