

A study on the impact of online learning on sleep quality among medical students

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Abstract

Background: Due to the COVID pandemic, online classes have become mandatory in our educational systems which has led to increase in the usage of blue light emitting devices like smartphones, tablets, laptops. This has led to increased cognitive stimulation resulting in sleep disturbances, emotional distress, sleep deprivation and other mental health related issues. **Aim:** The aim of our study is to assess the impact of online learning on sleep quality among medical students. **Materials and Methods:** Our study is an observational cross-sectional study conducted among medical students of government medical college. The sample size was calculated to be 203. A pre-validated questionnaire "Pittsburgh Sleep Quality Index (PSQI)" was used to assess the sleep quality of the medical students. Healthy college students of age between 18-23 years of both sexes, who have attended online classes during covid pandemic, and who are willing to participate in the study were included. The pre-validated questionnaire in google form format was sent to them and their responses were collected. It is a self-reported questionnaire that evaluates the quality of sleep over the previous month. **Results:** 226 students including 106 males and 120 female students participated in our study. Our study shows that around 41% of students are affected by poor or very poor sleep quality. In our study almost 30% of medical students have an increased sleep latency. **Conclusion:** There is an increase in prevalence of poor sleep quality among medical college students. Interventions are needed to prevent any long-term complications.

Key words: medical students, online learning, sleep quality

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Introduction

Sleep is not a true unconscious state, even during their deepest sleep, there is always some extent of awareness of the external environment. There are 2 stages of sleep that alternate throughout the sleep state – REM (Rapid Eye movement), and NREM (non-rapid eye movement).¹

Polysomnogram is considered to be the gold standard method to assess the quality of sleep. However, sleep can also be evaluated subjectively using various indices, of which the Pittsburgh Sleep Quality Index is extensively used.

Coronavirus – COVID – an ongoing pandemic caused by COVID -19 SARS CoV 2 virus, wreaking havoc worldwide due to its constant mutations.

This has led to the closing of educational institutions with the resultant rise of e-learning methods involving digital platforms for teaching.

COVID 19 pandemic has led to various other problems including, sleep deprivation, stress, and depression among the general public. In particular, students who are suddenly exposed to increased screen time are particularly at risk of having sleep deprivation-related problems. A delayed sleep phase, use of electronic devices, and social life are associated with adolescents' sleep behaviour. More importantly, sleep deprivation is often associated with increased levels of psychological distress among teenagers. Researchers have proved that mental health and sleep have a bidirectional relationship, like sleep deprivation and poor quality of sleep can lead to psychological illnesses like depression, anxiety, and stress.

Students who are attending online classes at home are at risk of increased exposure of blue light emitting from mobile/ tablet/ laptop screen which in turn affects their sleep quality. In our study we explore the impact of online learning on sleep quality of medical college students.

Aim

The aim of our study is to assess the impact of online learning on sleep quality among medical students.

Objectives

1. To assess the effect of online learning on sleep quality among medical students.
2. To evaluate the prevalence of poor sleep quality among medical students attending online learning.

Materials and Methods

Our study is an observational cross-sectional study conducted among medical students of government

medical college. A pre-validated questionnaire "Pittsburgh Sleep Quality Index (PSQI)" was used to assess the sleep quality of the medical students.^{2,3} The study was conducted after obtaining approval of Institutional Ethics Committee. The sample size was calculated as 203 using statistical tools.

Inclusion criteria

Healthy college students of age between 18-23 years of both sexes, who have attended online class, and who are willing to participate in the study were included.

Exclusion criteria

Students with known pre-existing sleep disorders, neurological disorders, history of any drug/substance abuse or dependence were excluded.

Students who use smart gadgets for video gaming > 2 hrs a day, who spend on watching smart phones continuously for more than 2 hrs a day (apart from online classes) were excluded from the study.

After getting their informed consent, the pre validated questionnaire in google form format was sent to them and their responses collected. It is a self-reported questionnaire which evaluates the quality of sleep over the previous month

Results

226 students including 106 males and 120 female students participated in our study and the responses were collected and analysed using SPSS statistical software version 17.

The pre validated Pittsburgh Sleep Quality Index (PQSI) questionnaire had 19 questions and their responses were categorised in 7 components which are categorised as follows: Subjective Sleep Quality, Sleep Latency (denotes the time taken to fall asleep), Sleep duration, Habitual Sleep

efficiency, Sleep disturbances, neediness for sleep medication and Daytime dysfunction (poor sleep affecting the next day's activity). Every single factor was allocated a score from 0 to 3, with 0 corresponding to good sleep and 3 corresponding to poor sleep. A total PSQI score ranging between 0-21 was determined for every study subject and then the compiled data were analysed.

A person with a score of ≤ 5 was considered as good sleeper, those of who have scored >5 to <8 categorised as poor sleepers and ≥ 8 fall under very poor sleepers category.

The total PSQI score signifies the overall quality of sleep whereas each component score helps us to have a better understanding of various aspects of sleep quality. Sleep latency is calculated by combining the score responses of questions 2 and 5a of the PSQI scale. On summation of the scores of questions 1,3 and 4 sleep efficiency is calculated. Sum of question 7 and 8 scores will give us the overall score of daytime dysfunction.

Graph 1: Overall PSQI score among male and female students

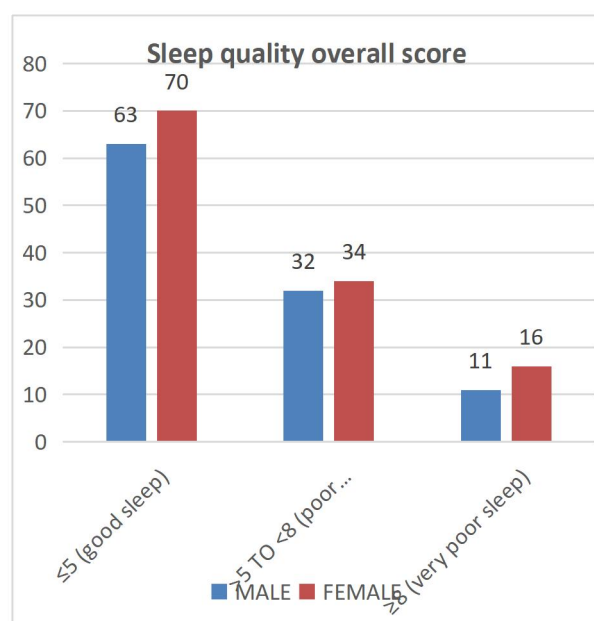


Table 1: Distribution of sleep latency percentage among students

Sleep latency			
Score	Male	Female	total
0	23.58%	22.50%	23.01%
1	44.34%	40.83%	42.48%
2	17.92%	25.00%	21.68%
3	14.15%	11.67%	12.83%

Table 2: Distribution of sleep disturbances among students

Sleep disturbance - male and female			
	Male	Female	Total
0	16.04%	10.00%	12.83%
1	80.19%	87.50%	84.07%
2	6.60%	3.33%	4.87%
3	0.00%	0.00%	0.00%

Table 3: Distribution of daytime dysfunction score among students

Daytime dysfunction score			
Score	Male	Female	Total
0	0.17	0.14	15.49%
1	0.55	0.61	57.96%
2	0.25	0.22	23.45%
3	0.03	0.03	3.10%

Discussion

The use of blue light emitting gadgets like smartphones, tablets, laptops have increased recently due to COVID pandemic. It's a common knowledge that sleep wake time plays an

important role in cognitive functions (memory, attentiveness) of an individual. Our study shows that around 41 % of students are affected by poor or very poor sleep quality. Jniene et al in their study has shown similar results among medical students.⁴

The time taken to fall asleep is denoted by sleep latency time. In our study almost 30% of medical students have an increased sleep latency. This could lead to disrupted circadian rhythm. Being confined within the walls of their house, addiction to social media networks have seen an alarming increase in the recent times, which could be attributed to poor sleep hygiene. It could also be due to increasing stress and anxiety among teenagers and their fear of acquiring COVID. Studies have shown more than 2 times increase in the prevalence of increased sleep latency time among teenagers before Vs during COVID pandemic.^{5,6}

Our study did not show any significant sleep disturbance among medical students. As sleep disturbance is a subjective perception, the above-mentioned insignificant result could be due to increased day time sleep among teenagers during this lockdown. Only 20% students have complained about day time dysfunction. This could also be due to the fact that the students didn't have much activity to do during the day time. Our study shows no significant difference in sleep quality among male and female students which is also supported by similar other studies worldwide.⁶

Khare et al in his study observed an 60 % increase in screen time among medical students during lockdown period. Increasing usage of social networks, listening to online lectures, CME in online platforms could be listed as few reasons behind the increase use of electronic gadgets. These electronic gadgets emit a blue light of short wavelength which have shown to delay the release

of melatonin which subsequently affects the circadian rhythm and sleep quality.⁷

Since we have excluded other causes for prolonged exposure to blue light emitting devices like prolonged online video gaming, over usage of smart gadgets, we can establish that online classes definitely has got some effect on the sleep quality index of medical students.

Conclusion

Our study shows an increase in sleep quality deterioration among medical students. It also shows evidence of increasing sleep latency time. This could be attributed to online classes taken as a part of their curriculum as well as increase in usage of online learning platforms during COVID Pandemic. Hence appropriate interventions should be implemented in order to avoid any long-term consequences of poor sleep quality. Minimizing blue light emitting devices at least 1 hour prior to sleep, physiotherapy exercises targeting eye muscles, yoga and meditation should be included as a part of their lifestyle.

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Conflict of interest: Nil

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