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Impact Of Stress And Screen Time On Sleep Among Medical Students - A Cross Sectional Study

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ABSTRACT

Introduction: *Sleep is a physiological process that is required for physical, mental, and social well-being. An outbreak of the covid pandemic made a huge impact on the teaching methodology in the academia due to lockdown which had an indirect impact on the sleep and lifestyle of the students.*

Aim: *The aim of this study was to evaluate the quality of sleep among medical students and to correlate it with stress and screen time exposure during the covid period.*

Materials and Methods*: A cross-sectional study was conducted among 265 medical undergraduate students aged 18 to 25 years. Stress levels were assessed using perceived stress scale, sleep quality of the study participants were assessed using the Pittsburg Sleep Quality Index (PSQI), sleep hygiene, and screen time exposure were assessed using questionnaires like Sleep Hygiene Index (SHI), Screen Time Questionnaire.*

Results: *Sleep quality and sleep hygiene were both reduced among the students.44% of students had moderately poor sleep quality, while 12% had severely poor sleep quality. When their stress levels were assessed, it was found that 69% of them were moderately stressed and 17% were severely stressed, with female participants predominating males. Screen time exposure during the weekdays was associated with sleep quality and duration.*

Conclusion: *The study showed the prevalence of poor sleep quality was higher among medical students, and increased screen time usage has an impact on sleep quality.*

KEYWORDS: *COVID, medical students, sleep quality, wellbeing, sleep hygiene, screen time, stress levels*

INTRODUCTION

Sleep is a necessary element of life and is required for healthy living. NREM and REM sleep are the two types of sleep. Sleep is essential for memory consolidation, which is necessary for high academic achievement(1). A healthy adult need an average of eight hours of uninterrupted sleep per night. Since the pandemic's breakdown, the academic institutions has adapted several novel educational techniques that ensure student's continuous education (2). One of the most notable developments was the discontinuance of in-person (face-to-face) teaching sessions, which were mostly replaced by video lectures or live streaming(3). Such circumstances had a negative impact on the mental health of medical students. As a result, the young medical students began to rely on devices for their normal academic programs as well. Their gaze is always drawn to the cell phone, tablet, laptops and computers (4). The average amount of time spent on screens by individuals is increasing.

Excessive screen time is associated to poor sleep through a variety of mechanisms, including nocturnal exposure to bright lights, which may reduce melatonin production, and the displacement of other sleep-promoting activities, such as physical activity(5). Screen use could exacerbate medical student's risk of depression, anxiety, and inattention(6), all of which have a negative impact on cognitive functioning and

learning(7). As a result, this study was conducted to assess the relationship between sleep hygiene, screen time exposure, stress, and sleep quality among medical students.

MATERIALS AND METHODS

This cross-sectional study on the medical undergraduates was initiated after receiving the approval of the Institutional Ethics committee (Ref: CSP/20/AUG/COVID/03). Medical students aged 18 to 25 participated in the study. After sharing an audio recording in which the investigator discussed the protocol of the study, the benefits of the research, and other details, the study participants provided electronic informed consent. Consented participants took about 15 minutes to complete a web-based survey. This study lasted three months, beginning in September 2020 (the lockdown phase). Subjects who were taking psychoactive medicines or any other medications that could influence neurocognitive and behavioral abilities, such as acetylcholinesterase inhibitors, or who had a history of asthma, migraine, epilepsy, mental condition, cerebrovascular accidents, or who had a history of dementia were excluded. There were 265 study participants that met these criteria and completed all of the surveys.

Study tools

The survey included, four validated and widely used tools: the Sleep Hygiene Index (SHI)(8), the Pittsburg Sleep Quality Index (PSQI)(9), the Perceived Stress Scale (PSS) with four items(10),Screen Time Questionnaire(5).

Statistical analysis

SPSS Statistical software version 20 was used for statistical analysis. The data was stratified by gender, age, tool scores, and other demographic characteristics before being analysed with an Independent t-test or ANOVA for normally distributed parametric variables. The chi-square test was used to compare categorical variables. The data is presented as mean and standard deviation, with ≤p 0.05 regarded statistically significant.

RESULTS

This cross-sectional study included 265 medical undergraduates. The descriptive characterisctics of the study participants are given in Table1.

Table1: Descriptive characteristics of the study participants (N = 265)		
Variables		**n** (%)
Age	**18-21**	150 (56.6%)
	≥22	115 (43.4%)
Gender	**Male**	113(42.6%)
	Female	152 (57.4%)
Year of study	**2nd year MBBS**	85(32.08%)
	3rd year MBBS	88 (33.21%)
	4th year MBBS	92 (34.71%)
Type of family	**Nuclear family**	229 (86.4%)
	Joint family	36 (13.6%)
Socioeconomic status	**Upper**	174 (65.7%)
	Upper middle	91 (34.3%)

Assessment of the study participant's stress levels revealed that 17% had severe stress, whereas 69% exhibited moderate stress. Students aged 18 to 21years had higher stress levels than those over 22 years (Table 2). Moreover, female students indicated markedly elevated stress levels compared to their male counterparts.

Table 2: Comparison of PSQI, SHI, PSS scores, and screen time exposure across variables								
Variables		**PSQI (Mean±SD)**	**SHI (Mean±SD)**	**PSS (Mean±SD)**	**Weekday Screen time usage n (%)**		**Weekend Screen time usage n (%)**	
					≤2 hrs	**≥2hrs**	**≤2 hrs**	**≥2hrs**
Age	**18-21**	6.4±3.7	35.7 ±9.5	8.1 ±3.1*	84(60 %)	66(52.8 %)	84(56%)	66(44%)
	≥22	6.6±2.9*	33.9 ±6.1	8.1 ±2.1	56(40 %)	59(47.2 %)	58(50.4 %)	57(49.6%)

Gender	Male	6.4±3.5	34.7 ±7.8	7.9 ±2.5	58(51.3 %)	55(48.7 %)	55(48.7 %)	58(51.3%)
	Female	6.6±3.3	35.1±8.5	8.3 ±2.7*	82(53.9%)	70(46.1 %)	87(57.2 %)	65(44.8%)
Year of study	2nd Year MBBS	6.9±4.3	35.6±9.8	8.1 ±2.4	46(33 %)	40 (32%)	50(35.2 %)	35 (28.4%)
	3rd Year MBBS	6.2±2.1	34.5 ±6.1	7.9 ±2.1	47(33.5 %)	40(32 %)	40(28.1 %)	47(38.2%)
	4th Year MBBS	6.6±3.6	34.5 ±7.9	8.4 ±2.7	47(33.5 %)	45 (36%)	52(36.6 %)	41(33.3%)
Type of family	Nuclear family	6.5±3.4	35±8.2	8.1 ±2.6	124(54.1 %)	105(45.9 %)	122(53.3 %)	107(46.7 %)
	Joint family	6.4±3.6	34.5 ±8.3	8.6 ±3.1	16(44.4 %)	20(55.6 %)	20(55.6 %)	16(44.4%)
Socio economic status	Upper	6.3±3.6	35±8.6	7.98 ± 2.78	96(55.2 %)	78(44.8 %)	98(56.3 %)	76(43.7%)
	Upper middle	6.9±2.9	34.7±7.52	8.46 ± 2.4	44(44.8 %)	47(55.2 %)	44(43.7 %)	47(56.3%)

*Indicates statistical significance, $p<0.05$

Upon evaluating sleep quality, it was found that 56% of the study participants (Fig 1) had poor sleep quality, indicated by a PSQI score over 5, while 12% had a PSQI score greater than 10.

Fig 1: Prevalence of poor sleep quality among medical students

Additionally, participants aged more than 22 years exhibited significant poor sleep quality (Table 2) compared to younger students. Furthermore, the global PSQI and the sleep hygiene Index showed (Fig 2) a significant moderate correlation (r=0.41).

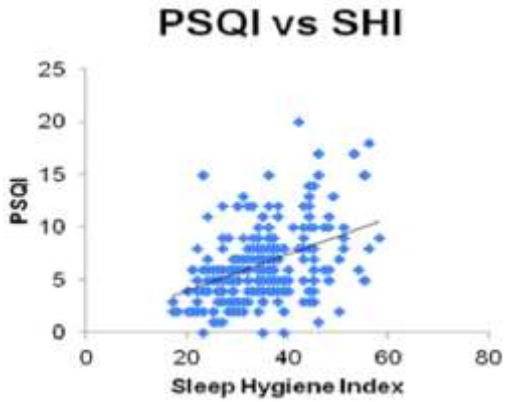
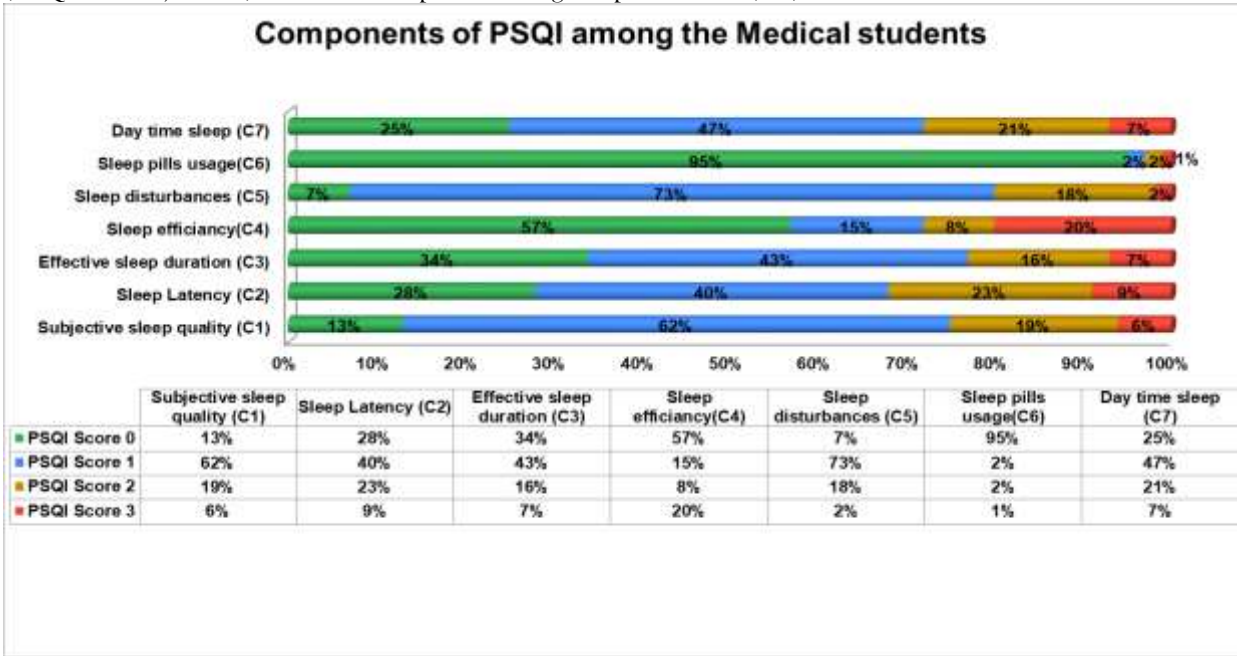


Fig 2: Correlation between Sleep Hygiene Index and Sleep quality

Figure 3 depicted a comparison of the PSQI's individual components among research participants. The study participant's subjective sleep quality (C1) was found to be fairly poor (PSQI Score 2) in 19% and very poor (PSQI Score 3) in 6%. Sleep latency (C2) was higher (>30 mins) in 32% of the students, with 9% having more than 60 mins (Fig 4) and nearly 7% (C3) having less than 5 hours (PSQI Score 3). Nearly 20% (PSQI

score 2 & 3) of study participants had sleep efficacy (C4) of less than 65%. Furthermore, nearly 20% (PSQI score 2 & 3) of research participants reported sleep disturbances, and 28% (PSQI score 2 & 3) reported daytime sleepiness once or twice a week, as indicated by PSQI components 5 and 7. In addition, over 5% (PSQI score 1, 2 & 3) of students reported using sleep medicine (C6).



	Subjective sleep quality (C1)	Sleep Latency (C2)	Effective sleep duration (C3)	Sleep efficiancy(C4)	Sleep disturbances (C5)	Sleep pills usage(C6)	Day time sleep (C7)
PSQI Score 0	13%	28%	34%	57%	7%	95%	25%
PSQI Score 1	62%	40%	43%	15%	73%	2%	47%
PSQI Score 2	19%	23%	16%	8%	18%	2%	21%
PSQI Score 3	6%	9%	7%	20%	2%	1%	7%

Fig 3: Components of PSQI among the study participants

While evaluating subjective sleep quality and duration (PSQI components 1 and 3), significant associations were detected with screen time that exceeded 2 hours per day during the week day (Table 3).

Table 3: Comparison of select PSQI components with Screen Time

PSQI components		Screen time on a weekday			Screen time on weekend		
		≤2 hs	≥2hrs	P-value	≤2 hrs	≥2hrs	P-value
Subjective sleep quality (C1)	Good	78(39)	122(61)	<0.001	20(10)	180(90)	NS
	Bad	8(12.3)	57(87.7)		6(9.2)	59(90.8)	
Sleep latency (C2)	≤ 30 mins	62(34.3)	119(65.7)	NS	15(8.3)	166 (91.7)	NS
	>30mins	24(28.6)	60(71.4)		11(13.1)	73(86.9)	
Sleep duration (C3)	≤ 6hrs	85(41.5)	120(58.5)	<0.001	20(9.8)	185(90.2)	NS
	< 6hrs	1(1.7)	59(98.3)		6(10)	54(90)	

NS: not statistically significant

DISCUSSION

This cross-sectional study aimed to assess sleep quality and associate it with stress and screen time among medical students during the covid period.

Stress level and screen time exposure (more than 2 hours) were significantly higher among individuals aged 18-21 years, and this was more prevalent among females. Sharing feelings, emotions, and parental support can help relieve stress and help to deal with stress more confidently (11,12). Since this study was conducted during the initial wave of the covid pandemic, the observed outcomes in study participants could possibly be attributed to fear of infection, financial stress, a lack of friends, and several of other reasons.

Poor sleep quantity and hygiene were observed in female study participants, and it increased with age. This finding is consistent with a previously reported study in a similar cohort during the non-covid phase(11).This could be linked to a variety of circumstances, including pressure to satisfy parental expectations, peer pressure, difficulties combating study stress, study-life balance, concealed financial issues, etc. Since sleep quality has a direct association with cognition and memory, which are critical during the student phase (1) the necessity of getting enough sleep should be emphasised to students.

During COVID era, students sleeping habits altered dramatically due to confinement at home. Furthermore, the loneliness and estrangement from their peers, mixed with the impact of lost playtime,

could have contributed to it (13,14). In our study, the influence of screen timing, particularly on weekdays, was demonstrated to have an effect on the quality and amount of sleep. According to studies, inappropriate sleep scheduling, stimulating activities like watching television or using mobile phones close to night, and maintaining an uncomfortable sleep environment can all lead to poor sleep hygiene(6,15). According to our findings, poor sleep hygiene contributes to poor sleep quality. This conclusion is consistent with previous research(14).

CONCLUSION

Stress and screen time exposure have an impact on the sleep quality of undergraduate medical students. Hence measures should be taken to inculcate the necessity of getting enough sleep and learning appropriate stress management techniques. They should be educated on the negative health effects of prolonged screen time.

Abbreviations:

COVID: Corona Virus disease
SHI: Sleep hygiene index
PSQI: Pittsburg sleep quality index
PSS: Perceived stress scale

Compliance with Ethical Standards:

- **Disclosure of potential conflicts of interest:** The authors declare that they have no competing interests.
- **Financial interests:** The authors declare they have no financial interests
- **Research involving Human Participants and/or Animals:** The current study was conducted virtually via Google forms among medical undergraduates. IEC (IRB) approval was obtained from Sri Ramachandra Institute of Higher Education & Research, REF: CSP/20/AUG/COVID/04 and it was carried out in accordance with relevant ethical guidelines and regulations (e.g. Declaration of Helsinki). The study was also registered in Clinical Trials Registry – India (ICMR-NIMS), REF/2020/09/036699 as it was done during COVID pandemic.

Informed consent: Informed consent via google forms (https://forms.gle/b7VfmQwJALGdduxG7) were obtained from all the study participants and we ensured that the personal details of the study participants were not disclosed.

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