

## Screen Time and Sleep Patterns: A Cross-Sectional Analysis among Undergraduate Medical Students in a Tertiary Care Hospital of West Bengal

Srinjay Ghosh<sup>1</sup>, Debargha Mitra<sup>2</sup>, Md Samsuzzaman<sup>3</sup>, Chinmay Nandi<sup>4</sup>, Sudip Ghosh<sup>5</sup>, Prमित Goswami<sup>6</sup>

<sup>1,2</sup>Undergraduate Medical Student, Burdwan Medical College Hospital

<sup>3,4,6</sup>Assistant Professor, Department of Community Medicine, Burdwan Medical College Hospital

<sup>5</sup>Senior Statistician, Burdwan Medical College Hospital

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Corresponding Author: Dr. Prमित Goswami

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### Abstract:

**Introduction:** The current generation of teenagers is growing up immersed in a world saturated with electronic devices which is leading to alteration in sleep pattern and ocular manifestation. So, this study is focusing on assessing the screen time and sleep pattern of undergraduate medical students in a tertiary care hospital.

**Objective:** To assess the effects of screen-time on sleep pattern among undergraduate medical students of a medical college in West Bengal.

**Materials and Methods:** It was an institution based descriptive type of observational study, cross-sectional in design. The data was collected in May-June 2023 with the help of a semi structured questionnaire, circulated among the students. The collected data was analyzed and organized using MS Excel 2019. A pre-designed, pre-tested and semi-structured questionnaire comprising of sociodemographic profile, screentime assessment scale, Athens insomnia scale, knowledge and practice questionnaire.

**Result:** Among the 800 undergraduate medical students, 349 students took part in the study. After analysis it was found that there is a positive correlation between screen time and sleep pattern ( $r$  value =0.460), indicating insomnia increases with screen time. It was also found that 34.9% of the study subjects have screen time between 4 to 6 hours and 34% of the study subjects have insomnia. It was also inferred that there is a gap between knowledge and practice.

**Conclusion:** From this study it can be concluded that insomnia and other ocular manifestations increase with screen time. Hence, it is recommended to people to reduce screen time as much as possible.

**Keywords:** Athen's Insomnia Scale, Sleep, Screentime, Undergraduate Medical Students.

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### Introduction

With the advent of the digital era, paper has been replaced by the screen. Screen time is the amount of time spent in front of the screen using a device[1]. Easy Smartphone access, cheap internet availability, and free content have greatly contributed to the increase in screen time. The emergence of the coronavirus pandemic has made work from home and online education a part of life, which has significantly increased screen time which in turn has negative consequences. The current generation of teenagers is growing up immersed in a world saturated with electronic devices. Media use of screen-based electronic devices is extensive, mostly in smartphones, computers, and tablets including television shows. Excessive screen time is related to recent hike in mental health and sleep problems among young people, which has been the focus of this research.

"The timing of sleep and wakefulness is controlled by two areas in the brain. One is highly sensitive to light and drives wakefulness, while the other, called the pineal gland, secretes the sleep hormone melatonin when the light dims in the evening," Dr. Cooper says[2] Device screens produce blue light, which is the part of the light spectrum most active in our sleep cycle. Stimulation of pineal gland of the brain by light suppresses production of melatonin, making it difficult for many people to "turn off" their brains and fall asleep. Ongoing sleep deprivation can lead to health problems such as heart disease, diabetes, high blood pressure, depression and obesity. Ongoing sleep deprivation can lead to excessive daytime sleepiness, a loss of the ability to concentrate and difficulty in performing daily tasks [2] has been the focus of this research. The present study was conducted

with the objective to assess the effects of screen time on sleep pattern among undergraduate medical students of a tertiary medical college in West Bengal. In the year of 2021, a study of All India Institute of Medical Sciences, Bhubaneswar, Odisha, India [3], done by Sahu S et. al, it is found that in engineering college students, median screen time was 8 hours, which ranged from 3 to 13 hours per day, whereas, in medical college students, it was 5.25 hr per day that ranged from 1.5 to 15.1 hr per day. Also the sleep quality of the students was assessed using the PQSI tool. It was found that 66% of the students from the engineering college had disturbed sleep, while 43% of the medical college students reported disturbed sleeping US adults.

### Materials and Methods

The present study is an institution based descriptive type of observational study with a cross-sectional study design which was conducted at Burdwan Medical College, Purba Bardhaman, West Bengal.

**Study duration:** The study was conducted over a period of one month from 18th May, 2023 to 17th June, 2023.

**Inclusion criteria:** All undergraduate medical students presently studying in Burdwan Medical College during the period of study satisfying following criteria were considered as study population. Among the study population those who are willing to participate in the study and those who are using Smartphone, laptop, tablet or any other kinds of screen are included in this study.

**Exclusion criteria:** Students not responding despite giving reminders for times within the fixed period were excluded from the study.

**Tools & Data collection:** A predesigned and pre tested semi structured questionnaire was used to study subjects.

1. Screen time assessment scale
2. Athens insomnia scale
3. Knowledge and practice questionnaire

1. Screen time assessment scale: A set of 8 questions which looks into different aspects of the amount of screen time spent by an individual and some possible consequences - eye strain, headache, back pain, about the aforesaid matter. According to the American Academy of Paediatrics, a screen time of >2hr/day for all age groups above 2 years is detrimental for the eye.

2. Athens insomnia scale [4]: The 8 questions of Athens Insomnia Scale are used to assess the sleep quality of an individual. The scoring for each question varies from 0 to 3 with 0 depicting the item in the question has not been a problem and 3

indicating more acute sleep difficulties (forward scoring). Developers suggest a cut-off score of 6 which correctly distinguished between insomnia scores of each question is then added up to get total score (which will be between 0-24) which is then compared with the Athens Insomnia scale scoring as follows-

Less than 6 - No insomnia

More than or equal to 6 - Insomnia present

3. Knowledge and practice evaluation questionnaire: This questionnaire explores knowledge and practice of an individual about exposure to screen time such as- 20-20-20 rule (The 20-20-20 rule is a technique to help prevent eye strain caused by staring at screens for long periods, also known as digital eye strain. The rule involves taking a break every 20 minutes to look at something 20 feet away for at least 20 seconds.), using screen in dark room, use of lubricating eye drops, anti-glare and anti UV coating glasses.

### Ethical Considerations

1. Informed consent was taken from participants.
2. Confidentiality and anonymity was maintained.

**Statistical analysis:** The collected data was organized and analyzed into MS EXCEL sheet version 2019. Appropriate descriptive and statistical tools were used to represent the data in bar diagram, pie chart etc. Inferential statistical tools were used to find the correlations, if any.

### Results

The Socio-demographic pattern among the undergraduate medical students of Burdwan Medical College and Hospital was seen- Maximum respondents were from the 2nd Professional MBBS batch. The socio-demographic profile of the study subjects reveals that more than one-third (40.9%) are aged between 20-22 years, with a majority being male (59%). In terms of religion, 78.5% of the subjects follow Hinduism, with smaller proportions adhering to Islam, Christianity, and Sikhism. Regarding their parents' occupations, more than half (54.7%) of the fathers are servicemen, while others are involved in business, farming, or other professions. Additionally, the majority of the mothers (77.9%) are homemakers.

This profile suggests that most of the study participants come from a background where the father is engaged in formal employment and the mother manages the household. The screen time assessment of the study subjects reveals that more than one-third (34.9%) spend 4-6 hours daily in front of a screen, with the majority (87%) using mobile phones as their primary device. Regarding the purpose of screen use, 38.9% of the subjects spend most of their screen time on social media for

recreation. Additionally, 46.7% of the participants interact with screens as soon as they wake up, highlighting the prevalence of early-day screen use. More than half (52.7%) of the subjects experience physical effects, such as eye strain, from prolonged screen time. Furthermore, 54% believe that screen time has an impact on their behavior, and 69% think they would be happier with less screen time. Finally, a significant majority (90%) of the participants feel that it is important to set goals to reduce their screen time. (Table No: 01)

The study results highlight that a significant proportion of students (66%) do not suffer from insomnia, while 34% have insomnia (Figure=01), as determined by the Athens Insomnia Scale. In terms of awareness, the vast majority (91.97%) believe that excessive screen time can negatively affect their eyes, and 91.4% practice reducing

screen luminance during screen usage. However, 92% of students do not use lubricating fluid for eye care. When it comes to knowledge and practice, only 31.6% of students are aware of the 20-20-20 rule, and even fewer (14%) actually follow it. Similarly, while 90% know that watching screens in dark rooms can harm their eyes, only 61% avoid this behavior.

The study also examined the correlation between screen time and insomnia, showing that insomnia increases with longer screen time. For instance, 36.9% of students with 4-6 hours of screen time experienced insomnia, and this number jumped to 66.7% for those with 6-8 hours of screen time. The positive correlation ( $r=0.460$ ) between screen time and insomnia confirms that increased screen exposure is associated with a higher likelihood of insomnia. (Table No: 02)

**Table 1: Table showing distribution of study subjects according to Socio Demographic and screen time (n=349)**

Category	Subcategory	Frequency (n)	Percentage (%)
<b>Age Distribution</b>	18-20 years	83	23.8%
	20-22 years	143	40.9%
	22-24 years	118	33.8%
	24-26 years	5	1.4%
<b>Gender</b>	Male	205	59%
	Female	144	41%
<b>Religion</b>	Hinduism	274	78.5%
	Muslim	65	18.6%
	Christian	6	1.7%
	Sikhism	4	1.2%
<b>Father's Occupation</b>	Service	191	54.7%
	Business	66	19%
	Farmer	61	17%
	Others	31	8.9%
<b>Mother's Occupation</b>	Homemaker	272	77.9%
	Service	12	3.4%
	Business	15	4.3%
	Others	50	14.3%
<b>Family Type</b>	Nuclear	289	83%
	Joint	60	17%
<b>Residence Type</b>	Urban	202	58%
	Rural	147	42%
<b>Current Residence</b>	Hostel	228	65.3%
	Day scholar	121	34.7%
<b>Socio-economic Status</b>	Upper Class	197	56.4%
	Upper Middle Class	49	14.0%
	Middle Class	37	10.6%
	Lower Middle Class	37	10.6%
	Lower Class	29	8.3%
<b>Screen Time (Daily)</b>	Less than 1 hour	14	4%
	1-2 hours	81	23.2%
	2-4 hours	122	34.9%
	4-6 hours	122	34.9%
	6-8 hours	-	-
	More than 8 hours	10	2.9%
<b>Primary Device Used</b>	Mobile	303	87%

	Tablet	14	4%
	Computer	32	9%
<b>Purpose of Screen Time</b>	Social Media	136	38.9%
	Educational Purposes	118	33.8%
	Movies/TV Shows/Streaming Platforms	81	23.2%
	Video Games	14	4%
<b>Screen Interaction Time</b>	As soon as I wake up	163	46.7%
	Within an hour of waking up	148	42.4%
	Several hours after waking up	38	10.9%
<b>Physical Effects</b>	Eye strain	184	52.7%
<b>Behavioral Impact</b>	Yes	163	54%
	No	136	46%
<b>Happiness with Less Screen Time</b>	Yes	241	69%
	No	108	31%
<b>Goal to Reduce Screen Time</b>	Yes	314	90%
	No	35	10%

Table 2: Correlation in between insomnia and screen time (n=349)

Category	Number of Students	Percentage (%)	Additional Information
<b>AIS Scores - Presence/Absence of Insomnia</b>			
No Insomnia (AIS score 0-5)	230	66%	Majority do not suffer from insomnia.
Insomnia Present (AIS score $\geq 6$ )	119	34%	Significant percentage suffer from insomnia.
<b>Belief That Screen Time Affects Eyes</b>			
Yes	321	91.97%	Most believe screen time affects their eyes.
No	28	8.02%	
<b>Practice of Reducing Screen Luminance</b>			
Yes	319	91.4%	Most students reduce screen luminance during use.
No	30	8.47%	
<b>Use of Lubricating Fluid</b>			
No	321	92%	Majority do not use lubricating fluid.
Yes	28	8%	
<b>Knowledge and Practice of 20-20-20 Rule</b>			
Knowledge of Rule	N/A	31.6%	Only a small percentage know about the 20-20-20 rule.
Practice of Rule	N/A	14%	Even fewer actually practice it.
<b>Awareness About Effects of Watching Screens in the Dark</b>			
Knowledge	N/A	90%	High awareness about the harmful effects of screens in dark.
Practice	N/A	61%	Lower percentage avoid watching screens in the dark.
<b>Screen Time and Insomnia Correlation</b>			
1-2 Hours	21	6.0%	14.3% of students in this group have insomnia.
2-4 Hours	78	22.3%	27.8% of students in this group have insomnia.
4-6 Hours	122	35.0%	36.9% of students in this group have insomnia.
6-8 Hours	79	22.6%	66.7% of students in this group have insomnia.
More than 8 Hours	49	14.0%	35.3% of students in this group have insomnia.
<b>Correlation (r-value) Between Screen Time and Insomnia</b>	N/A	r = 0.460	Positive correlation showing that more screen time leads to higher insomnia.

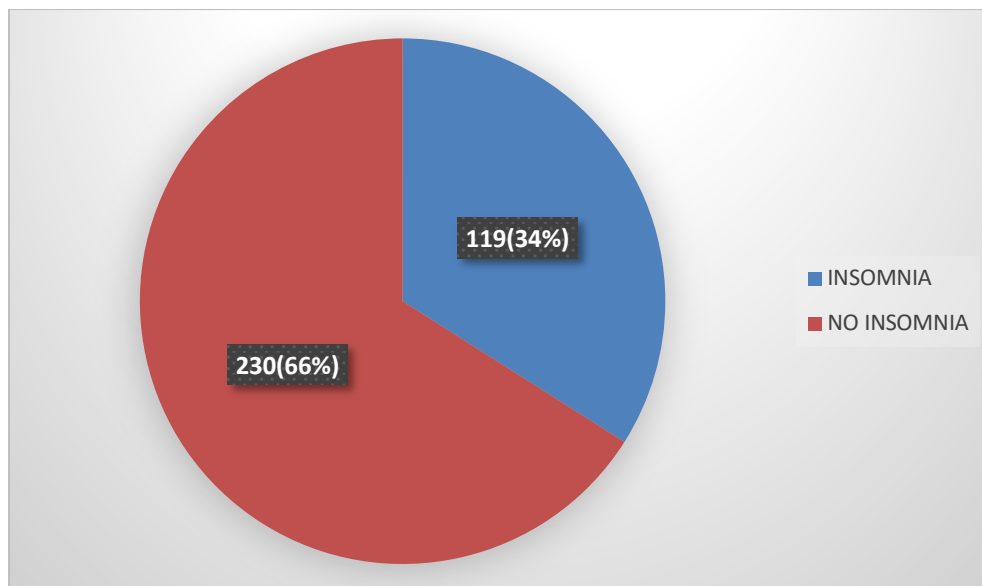


Figure 1: Pie diagram showing the distribution of study subjects according to their AIS scores (n=349)

**Knowledge and Practice among Study Subjects**

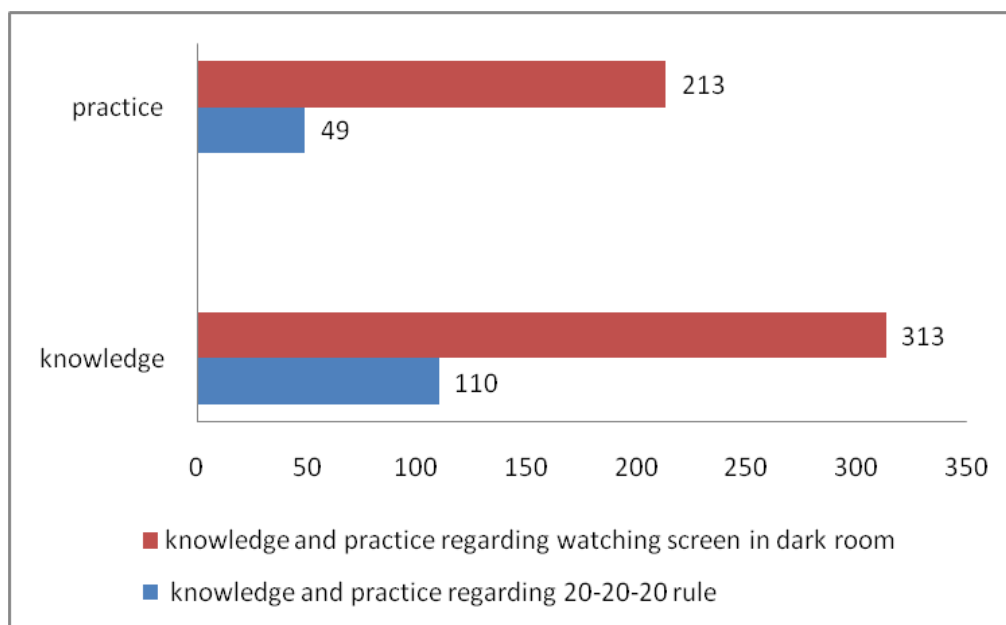


Figure 2: Compound bar diagram showing the distribution of study subjects according to their knowledge and practice (n=349)

**Discussion**

A cross sectional study based on data from a national survey of all college and university Students in Norway, the aim of which was to assess the relationship between social media and Sleep in a student population .The results of the study suggest a role of social media addiction on sleep, and also addictive social media use may be a target of intervention in order to reduce screen time [5]. In this study it was also found out that 38.96 % of the student spent majority of their screen time on social media due to recreational purpose, which had an impact on their sleep. A cross sectional study

which was conducted from October 14 , 2020 to November 14 , 2020 by administering an online questionnaire to Wannan Medical College students. Out of 2741 students who completed the survey, 1447 (52.8%) had smartphone addiction. The impacts of smartphone addiction on insomnia were found to be significant [6].

In this study also it was found that majority of the study subjects (87%) spend greater amount of their time on smartphone. A descriptive cross sectional study which was conducted with 310 respondents among undergraduate medical students at IQ City Medical College, Durgapur, West Bengal by

Bhattacharjee S et al from June to September 2020. Prevalence of computer vision syndrome in the study was found to be 58.38 %. The most disturbing symptom following continuous computer use was found to be headache (18.38%), followed by eye strain (13.87 %)[7] but in our study, it was found that most disturbing physical health effect was eye strain (52.72 %), followed by headache (43.3 %). A descriptive cross sectional study conducted among MBBS students of Stanley Medical College, Chennai by R. Senthil Kumar et al, and August to September 2009. About 300 students participated in it and prevalence was found to be 37 % [8][9][10]. In current study the prevalence of insomnia was calculated using the Athens Insomnia Scale, and it was found to be 34%.

### Limitations

It may be weaker to be generalized its result in all medical colleges as this study was done in a single medical college due to research constraints. Various information provided by the students cannot be verified & has to be put exactly the way they said, there might be a chance of conscious falsification of data, which may lead to some kind of recall bias.

### Conclusion

From the current study, interestingly, while a majority of students (91.97%) are aware of the adverse effects of prolonged screen use on eye health, there is a discrepancy between knowledge and practice. This gap between awareness and behavior highlights the need for more emphasis on adopting protective practices. This emphasizes the detrimental impact of excessive screen exposure on sleep quality, suggesting that interventions aimed at reducing screen time, especially before bed, could significantly improve the students' well-being. In conclusion, while the students demonstrate a general awareness of the negative effects of excessive screen time, there is a clear need for better practices to mitigate these effects, especially regarding eye health and sleep quality. Addressing this discrepancy and promoting healthy screen habits could help reduce the prevalence of issues like insomnia and eye strain.

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