



STUDY OF ASSOCIATION BETWEEN SCREEN TIME AND DAY TIME SLEEPINESS AMONG MEDICAL STUDENTS OF SUBBAIAH INSTITUTE OF MEDICAL SCIENCES, SHIVAMOGGA: A CROSS-SECTIONAL STUDY

Internal Medicine

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ABSTRACT

Background: Excessive daytime sleepiness is the increased propensity to sleep under circumstances considered inappropriate by the affected person and others. Various hypotheses predict that screen time has an effect on daytime sleepiness. **Aim:** The aim of this study is to find any association between screen time and daytime sleepiness in medical students and compare the daytime sleepiness among male and female medical students. **Methods:** It was a cross-sectional questionnaire-based study that was conducted after approval from the institutional ethics committee. After obtaining informed consent, data was collected. Demographic parameters like name, age, year of study, area of residence, caffeine consumption post 6pm were included along with the Epworth sleepiness scale questionnaire. Individuals with psychiatric illness were excluded from the study. Statistical analysis was done using Chi-square test. **Results:** Most of the participants were above 20 years of age and most of them were from 2nd year of MBBS. 58.3% had a screen time of 4-8 hours. 34.5% of the participants may be excessively sleepy and 6.5% were excessively sleepy. When screen time and daytime sleepiness were compared, there were statistically significant results (p value ≤ 0.05). **Conclusion:** Individuals with more screen time had more daytime sleepiness when compared to those with less screen time. Students need to adopt methods to maintain a good sleep hygiene to avoid daytime sleepiness.

KEYWORDS

Medical students, Screen time, Excessive daytime sleepiness

INTRODUCTION

Sleep is a normal physiological process and one of the most important human behaviors. Adequate sleep is required for optimal functioning of the brain, energy conservation, thermoregulation and metabolic functioning (1). The medical undergraduates are one of the most distressed students and getting adequate sleep has always been a challenge for them. Many factors could affect the patterns of sleep in these students, leading to the sacrifice of quality and reducing the duration of sleep (2). One such factor is the screen time, which is the time spent by an individual in front of a Television, smartphone, laptop, tablet screen for various reasons like playing games, entertainment, education purposes and internet usage. Over the years because of the increased accessibility and affordability to the internet, it is no longer just an educational tool and the number of users keeps increasing day by day in turn leading to an increased screen time among all age groups (3). Smartphone use, especially at night at shown to provoke various circadian sleep wake rhythm disorders such as excessive daytime sleepiness (4). Excessive daytime sleepiness (EDS) is defined as the increased propensity to sleep under circumstances considered inappropriate by the affected person and others (5). This excessive day time sleepiness has disastrous effect on the academic achievements and health of these individuals (6).

A study conducted on undergraduate students has shown that Smartphone use was negatively associated with sleep outcomes (4). Other studies have shown that inadequate sleep time is associated with day time sleepiness (7). Recent studies also suggest that the prevalence of excessive daytime sleepiness had great association with excessive screen time among urban and rural high school children (8).

This study therefore throws light on the relationship between the screen time and daytime sleepiness among the medical undergraduates in a medical college in Shivamogga, Karnataka, India.

Objectives

- To study the effect of screen time on daytime sleepiness among medical undergraduate students of a private medical college in Shivamogga, Karnataka
- To compare the daytime sleepiness with respect to various demographic parameters among medical undergraduate students private medical college in Shivamogga, Karnataka

MATERIALS & METHODS

With the approval of the Institutional ethics committee, a cross-sectional study was done in undergraduates in Subbaiah Institute of Medical Sciences, Shivamogga. Study population includes all medical undergraduates from 1st to 4th year of MBBS.

Sample Technique: Universal Sampling technique
Sample Size: 500(out of which 432 participated)

Inclusion Criteria:

- Students studying in 1st, 2nd, 3rd, 4th year MBBS in the college

Exclusion Criteria:

- Students who have not given an informed consent
- Interns working in the college hospital
- Individuals with history of psychiatric illness

Method of Collection of Data: The students were asked to fill in the survey forms that were provided to them in their classrooms in their free time.

Data Collected

- Demographic data- Age, Sex, Year of study, Area of residence
- Questions about total screen time such as modes, reason for usage, device usage before bed and Other associated variables like history of psychiatric illness and Caffeine consumption
- Epworth sleepiness scale (9)- The Epworth sleepiness scale is a subjective measure of Individual's sleepiness. The test is a list of 8 situations in which you rate your tendency to become sleepy on a scale of 0-3. The combined score of all 8 components gives the total score. (Table 1)

For each situation, the individual decides whether or not they would have:

No chance of dozing = 0
Slight chance of dozing = 1
Moderate chance of dozing = 2
High chance of dozing = 3

Table 1: Epworth Sleepiness Scale

Situation	Chance of dozing
Sitting and reading	
Watching TV	
Sitting inactive in a public place (e.g., a theater or a meeting)	
As a passenger in a car for an hour without a break	
Lying down to rest in the afternoon when circumstances permit	
Sitting and talking to someone	
Sitting quietly after a lunch without alcohol	
In a car, while stopped for a few minutes in traffic	

Scoring Method:

Analyze of Score and Interpretation:

- 0-7: It is unlikely that you are abnormally sleepy.
- 8-9: You have an average amount of daytime sleepiness.
- 10-15: You may be excessively sleepy depending on the situation. You may want to consider seeking medical attention.
- 16-24: You are excessively sleepy and should consider seeking medical attention.

Statistics:

The data was entered into Microsoft excel. Descriptive statistics were used express the data. Statistical analysis was performed using Statistical Package for Social Sciences (SPSS) version 15. Chi-square test was used to find the association between screen time and day time sleepiness. p-value of less than 0.05 was considered as statistically significant.

RESULTS:

A total of 432 medical students participated in the study, out of which 27 students were excluded from the study.

Of the 405 participants in the study, 86 students (21.3%) were less than 20 years of age and 319 students (78.7%) were above 20 years of age. Majority of them were females (53.4%) and most of the participants were from an urban area (73.8%). Out of the 405 medical students 19.5% were in I MBBS, 33% from II MBBS, 30.4% from III MBBS, 17.1% from IV MBBS. Majority of the participants (60.7%) did not have caffeine intake after 6pm. The total screen time was 0-4 hours in 33.1% of the population, 4-8 hours in 58.3% and ≥ 8 hours in 8.6% of study population (Table 2).

Table 2: Characteristics Of The Individuals

Characteristics	Frequency	Percentage (%)
Age group		
<20	86	21.3
≥ 20	319	78.7
Gender		
Male	189	46.6
Female	216	53.4
Area of residence		
Rural	106	26.2
Urban	299	73.8
Year of study (MBBS)		
I	79	19.5
II	134	33.0
III	123	30.4
IV	69	17.1
Screen time (in hours)		
0-4	134	33.1
4-8	236	58.3
≥ 8	35	8.6
Use of caffeine (post 6pm)		
Yes	159	39.6
No	246	60.7

As given in Table 3, 39.5% were unlikely that they are abnormally sleepy, 19.5% have average amount of daytime sleepiness, 34.5% may be excessively sleepy and 6.5% are excessively sleepy.

Table 3: Sleepiness Score Interpretation

Interpretation (Sleepiness score)	Frequency	Percentage (%)
Unlikely that you are Abnormally sleepy (0-7)	160	39.5
Average amount of daytime sleepiness(8-9)	79	19.5
May be Excessively sleepy (10-15)	140	34.5
Excessively sleepy(16-24)	26	6.5
Total	405	100.0

Comparison of screen time and daytime sleepiness score is shown in

table 4, 33.6% of individuals with screen time of 0-4 hours were excessively sleepy, 42.9% of individuals with screen time of 4-8 hours were excessively sleepy and 57.3% of individuals with screen time of ≥ 8 hours were excessively sleepy which is statistically significant (p value ≤ 0.005).

Table 4: Comparison Of Screen Time And Daytime Sleepiness

Screen time (in hours)	Sleepiness score				p-value
	Unlikely that you are abnormally sleepy	Average amount of daytime sleepiness	May be Excessively sleepy	Excessively sleepy	
	Number (%)				
0-4(134)	68(50.8)	21(15.6)	38(28.3)	7(5.3)	0.005
4-8(236)	82(34.7)	53(22.4)	88(37.2)	13(5.7)	
≥ 8 (35)	10(28.5)	5(14.2)	14(40.0)	6(17.3)	

Comparison of daytime sleepiness among male and female is shown in table 5. 44.1% of females were excessively sleepy and 37.7% of males were excessively sleepy.

Table 5: Comparison Of Daytime Sleepiness Among Male And Female

Gender	Sleepiness score				p-value
	Unlikely that you are abnormally sleepy	Average amount of daytime sleepiness	May be Excessively sleepy	Excessively sleepy	
	Number (%)				
Female (216)	82(37.9)	39(18.0)	78(36.1)	17(8.0)	0.455
Male (189)	78(41.2)	40(21.1)	62(32.8)	9(4.9)	

Comparison of sleepiness score among people who consumed caffeine after 6pm is given in table 6. 41.5% of individuals may be excessively sleepy and 6.3% of individuals were excessively sleepy.

Table 6: Comparison Of Sleepiness Score Among Individuals Who Consumed Caffeine After 6pm

Sleepiness score	Frequency	Percentage (%)
Unlikely that you are Abnormally sleepy	55	34.6
Average amount of daytime sleepiness	28	17.6
May be Excessively sleepy	66	41.5
Excessively sleepy	10	6.3
Total	159	100.0

DISCUSSION

Excessive daytime sleepiness is a growing concern. The common causes of EDS include sleep disorders like Obstructive sleep apnea, narcolepsy and restless leg syndrome. Other causes include poor sleep hygiene and mental health disorders like depression and anxiety. The current study was done to find any relation between the screen time and excessive daytime sleepiness among medical undergraduate students in Subbaiah Institute of Medical Science, Shivamogga, Karnataka. This study also provides the prevalence of daytime sleepiness with respect to various demographic parameters like sex, age and caffeine consumption post 6pm.

Various hypothesis put forward predict that excessive exposure to light emitting diodes, especially before bedtime disrupts the biological clock and the circadian rhythm and the consequence of this includes causing headaches, shorter sleep duration and late bed time (10). Studies done till date to evaluate the effect of screen time of sleep cycle has shown that use of excessive screen time may lead of sleep related disorders and vice versa. The prevalence of self-reported insufficient sleep or EDS in general population has proved difficult to measure. This is due to lack of a standard tool to measure EDS. Some studies ask subjects to estimate the severity of excessive sleepiness, others the number of days per week they experience EDS and some use Epworth sleepiness scale as used in our study (11).

This study done using Epworth sleepiness scale shows excessive daytime sleepiness in 40.98% of students. This is lesser when compared to the daytime sleepiness studies done in Brazilian medical schools (42.4%) and more than the EDS experienced by students in Malaysia (35.5%) (12). In our study, the level of excessive daytime

sleepiness is more among females (44.1%) than males (37.7%). Whereas the studies done on medical students in Maharashtra, India have shown more daytime sleepiness among males and better sleep quality among females (13).

The light emitted from the devices has proven to disturb the circadian rhythm, which is associated with EDS (14). In our study when we compared screen time and daytime sleepiness, we found statistical significance. This shows that the relation is significant and not just by chance alone. This also proves that screen time is one of the contributing factors for excessive daytime sleepiness.

Another factor that has proven to affect the sleep cycle is caffeine. Adenosine is an endogenous peptide that regulates sleep by inhibiting cholinergic neurons within the basal forebrain that create arousal. Caffeine is a known adenosine blocker and inhibits this effect of adenosine (15). Hence consuming caffeine at night disrupts sleep and increased the daytime sleepiness. Among people who consumed caffeine post 6pm, 41.5% of individuals may be excessively sleepy and 6.3% of individuals were excessively sleepy but there was no statistically significance (p value >0.05). This conclusion is in agreement with studies done among college students in Ethiopia (16).

The treatment of EDS often starts off with optimization and maintenance of good sleep hygiene. As excessive screen time is often related to poor sleep hygiene. Reducing screen time can help an individual to maintain a good sleep hygiene and therefore reduce their daytime sleepiness. Specific treatment options for obstructive sleep apnea include weight reduction, adenotonsillectomy and continuous positive airway pressure (CPAP). Treatment for restlessness leg syndrome include iron supplementation and drugs like gabapentin or clonazepam. Therapy for insomnia and other and other causes of insufficient sleep initially begins with behavioral therapy with pharmacotherapy often acting as an adjuvant (17).

CONCLUSION

Individuals with more screen time had more daytime sleepiness when compared to those with lesser screen time. Excessive daytime sleepiness can have serious adverse effects when undiagnosed and untreated. Improper diagnosis can result in wrong treatment options and can worsen the daytime sleepiness. In conclusion we suggest that individuals should take measures to reduce the amount of screen time to have a proper sleep wake cycle, good sleep hygiene and reduce the amount of daytime sleepiness. This can help to improve the health and wellbeing of an individual.

Further studies should focus on studying the association between EDS and academic performance of individuals.

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Conflict of Interest

The authors declare no conflict of interest

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