

Increased Screen Time During the Pandemic: Lessons Learnt

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ABSTRACT

The pandemic of COVID-19 has led to change in the mode of learning to a virtual platform. This has resulted in an increase in screen time for students which has affected their overall health. The study was undertaken to assess the impact of increased screen time on physical and mental health of students across medical colleges of the state of Delhi, India.

Material & methods: A cross-sectional survey was conducted among medical students of Delhi in the month of May 2022. A pre-set questionnaire with 14 questions assessing the physical, mental and emotional health of students was filled online via google forms and 540 responses received were evaluated.

Results: The mean age of the study group was 19.9 years and 50.8% of the respondents were males. The average total screen time was between 6 to 7 hours in 34% students. Majority of students (35.9%) spent 5 to 6 hours of their total screen time in attending on-line classes while another 17.9% spent >7 hours on classes daily. 48% students had generalized anxiety disorder and 54.4% students had depressive disorder. 54.2% of the respondents spent <30 minutes on moderate physical activity during the week and 55.8% performed <15 minutes of vigorous exercise. 36% of students had only 5 to 6 hours of sleep daily with another 4% having <4 hours of sleep. Students experienced focussing problems most commonly (49.9%) followed by dry eye (34.9%), eye redness/itching(32.3%), photophobia in 28.1% and increased lacrimation in 19.4%.

The study indicated that online mode of learning in medical colleges negatively affected the physical activity, sleeping patterns and mental health of the students.

Key words: Online classes, screen time, physical health, mental health, medical students

INTRODUCTION

Time spent on any device with a screen such as television, smartphone, laptops, tablets etc is called "screen time". Since the smartphone came into existence, the screen-time has been increasing at a steady pace, but it has risen exponentially during the ongoing Covid-19 pandemic. The pandemic saw suspension of academic activities and surge in online classes across all educational institutions. The resulting increase in screen time among students and associated sedentary lifestyle and lack of social

interaction has adversely affected the well-being of students including their emotional, mental and physical health.^{1,2} High screen time is associated with deterioration in mental health leading to problems such as anxiety, depression and inadequate and poor quality sleep.^{3,4} This in turn are negatively associated with academic performance and social engagement. Also, the sedentary behaviour of students during virtual classes leads to increased risk of overweight and obesity which are known risk factors for development of cardiovascular disease,

hypertension and diabetes later in life. Prolonged screen time also influences the postural health including musculoskeletal aches and computer vision syndrome. Students with increased screen time have excessive neck flexion for prolonged periods leading to stress on these muscles and ultimately neck and shoulder pain.

Computer vision syndrome is a complex of eye and vision problems which are associated with extended computer or any digital device usage including eye strain, irritation, redness blurred or double vision.⁵ Keeping this in mind we undertook this study to evaluate the effect of increased screen time on the overall health of medical students, taking into account all the different aspects of their health including physical, mental and emotional.

Aims & objectives

To evaluate the effect of increasing screen time and its mental, physical and emotional repercussions on the students as well as to find incidence of computer vision syndrome amongst students studying medicine in Delhi.

Objectives include

- Mapping emotional and mental health
- Grading physical activity and comparing it with WHO recommendations
- Evaluating average sleep time per night
- Finding occurrence of symptoms of computer vision syndrome (digital eye strain)

MATERIAL & METHODS

It was a cross-sectional descriptive study conducted among medical students of Delhi in the month of May 2022. In the study, a pre-set questionnaire with 14 questions assessing the physical, mental and emotional health of medical students was filled online via google forms and the respective responses were evaluated. Informed consent was taken from the respondents at the start of the survey using the online survey platform. The study protocol was approved by the Institute

Ethics Committee, University College of Medical Sciences, Delhi.

A total of 540 students accessed and anonymously completed the online survey and their responses were evaluated.

Study questionnaire

The assessment of screen time was self-reported by participants regarding the time spent by them on any digital device. Physical activity was assessed using the NPAQ-short questionnaire consisting of 2 questions, one on Vigorous physical activity (VPA) and one on Moderate physical activity (MPA).⁶ Patient health questionnaire-2 (PHQ-2) and Generalised anxiety disorder 2-item (GAD-2) were used to assess the mental and emotional health of students. GAD-2 is short and concise consisting of 2 questions used to screen for generalised anxiety disorder whereas PHQ-2 is used to screen for depression. For both these questionnaires a total score out of 6 was given depending on the options chosen; higher the score more was the chance of the respective ailment. Sleep time was inquired and compared to WHO recommendations. The symptoms of computer vision syndrome were also evaluated through the questionnaire and the data collected was analyzed.

RESULTS

The mean age of the study group was 19.9 years and 50.8% of the respondents were males.

The average total screen time was between 6 to 7 hours in 34% students while 28.5% had screen time of ≥ 10 hours. Majority of students (35.9%) spent 5 to 6 hours of their total screen time in attending on-line classes while another 17.9% spent >7 hours on classes every day. (Table 1)

Forty-eight percent students scored ≥ 3 on GAD-2 indicating generalized anxiety disorder and 54.4% students scored ≥ 3 on PHQ-2 indicating depressive disorder. (Figure 1)

Table 1: Screen Time of Students

Total screen time (hours)	Number of students N=540	Percentage
<1	03	0.5
2-3	24	4.4
4-5	75	13.8
6-7	184	34
8-9	100	18.5
10-11	72	13.3
12-13	47	8.7
14-15	20	3.7
>16	15	2.7
Time(hours) spent on On-line classes out of total screen time		
<3	115	21.2
3-4	134	24.8
5-6	194	35.9
7-8	86	15.9
9-10	07	1.2
>10	04	0.74

More than half of the respondents (54.2%) spent <30 minutes on moderate physical activity during the week and 55.9% performed <15 minutes of vigorous exercise in a week. (Table 2)

Table 2: Average Daily Sleep (in hours) of Students

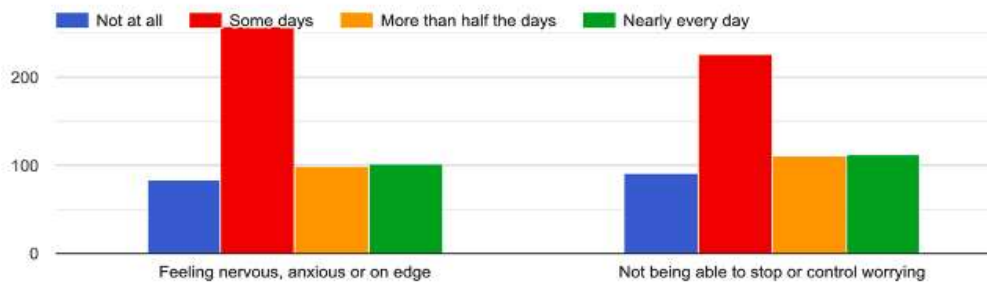
Average sleep (hours)	Number of students N=540	Percentage
< 2 hours	04	0.74
3-4	18	3.33
5-6	199	36.8
7-8	265	49
9-10	52	9.6
11-12	02	0.37

Table 3: Average Time spent per week on Physical Activity

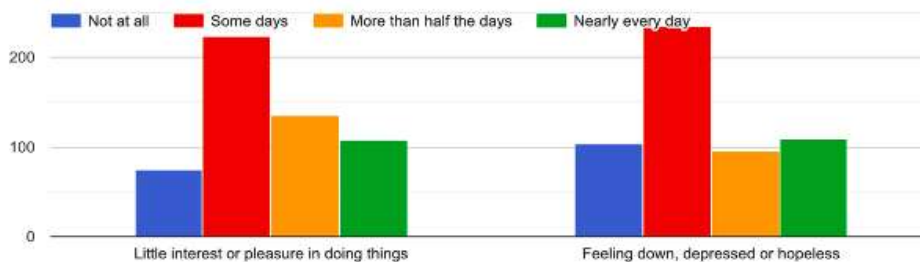
Time spent per week(minutes)	Moderate Physical Activity(N=540)	Percentage	Vigorous Physical Activity (N=540)	Percentage
<15 mins	155	28.7	302	55.9
15-30	138	25.5	78	14.4
30-90	122	22.5	75	13.8
90-150	54	10	34	6.2
150-300	39	7.2	18	3.3
>300	32	5.9	34	6.2

Table 4: Symptoms of Computer Vision Syndrome

Symptoms	Number (N=540)	Percentage
Headache	306	56.6
Focussing problems	270	50
Neck/shoulder pain	258	47.7
Dry eyes	189	35
Redness of eyes	175	32.4
Photophobia	152	28.1
Double vision	134	24.8
Excessive lacrimation	105	19.4



48.3% students scored ≥ 3 on GAD-2 indicating generalized anxiety disorder.



54.4% students scored ≥ 3 on PHQ-2 indicating depressive disorder.

Figure1: Mental and Emotional Health Assessment

Average daily sleep time was insufficient in many students with approximately 36% of students having only 5 to 6 hours of sleep daily with another 4% having <4 hours of sleep. (Table 3)

Of the various symptoms of computer vision syndrome, headaches were seen in 56.6% and neck and shoulder pain were experienced by 47% respondents. Of all the eye symptoms experienced by the students, focussing problems were most common (49.9%) followed by dry eye (34.9%), eye redness/itching (32.3%), photophobia in 28.1% and increased lacrimation in 19.4%. (Table 4)

DISCUSSION

The daily average amount of recommended screen time is 3.6 hours. Unfortunately, due to the online mode of education this has not been possible. In the cross sectional survey conducted by Gupta S et al in Indian students found a statistically significant difference between the screen time spent before and during covid 19 ($t=19.96$; $p<0-01$).⁷ This is also evident from this study in which the average daily screen time was more than six hours in majority of the respondents (81.1%). The concept of “Zoom Fatigue” was introduced for the first time in 2020 highlighting the mental fatigue which occurs due to the extra effort required to interact with others within the specific spatial dynamics of online classes.⁸ Also, this mode of learning leads to diminished interaction with peers and teachers and social isolation which ultimately leads to anxiety and depression. In a study by Sawhney et al, 15.8% of the participants agreed that online classes were the leading cause for triggering depression among students with 65% students believing that this form of education was actually having a negative effect on their academic life.⁹ Twenge et al had also concluded that higher screen time of more than seven hours per day was associated with lower psychological well-being and depression.¹⁰ Another study by Wu X et al among Chinese students also found that screen time

was directly related to progression of poor mental health.¹¹ Sharma et al in the study including 75 university students found a significant effect of online mode of learning on the mental health with 57.3% of the participants experiencing moderate stress and 32% having mild depression.¹² A recent study by Ragul Ganesh et al also concluded that participants with higher screen time had poor mental well-being.¹³ The present study also had majority of students having generalized anxiety(48%) and depressive disorder(54%).

The screen of electronic gadgets comprises of short wavelength and is similar to the blue light of visible spectrum. This light suppresses endogenous melatonin release and shifts the circadian rhythm and inhibits sleep promoting neurons causing sleep disturbances. Khare R et al in 2020 had concluded that sleep health of students had been adversely effected by increased screen time.¹⁴ Sawhney et al found that 54.9% of the participants attending online classes were going through various stages of insomnia.⁹ In the present study also 36.8% of students had only 5 to 6 hours of sleep daily with 4% reporting sleeping less than 4 hours per day. In a study by Khare R, 87.4% of students faced difficulty falling asleep and 70.4% has difficulty in maintaining sleep if the screen time was more than 2 hours per day.¹⁴ Maurya C et al examined the association between screen time and sleep problems among 16,292 adolescents. They concluded that adolescents who spent more than 2 hours on smart phone had higher odds of reporting sleep problems.¹⁵ Recently, Kumavat UC et al studied issues related to health problems faced during online learning. He found eye irritation to be the major concern followed by backpain, headache and thirstiness.¹⁶ Gupta S et al in their cross sectional survey on 210 Indian students found a significant positive correlation between screen usage time during Covid-19 pandemic with backache (0.62), neck pain(0.71), headache (0.50) and mental health(0.40).⁷ Musculoskeletal dysfunction with pronged use of laptop has

also been reported in various other studies.^{17,18} In the present study 56.6% of students complained of headaches and 47% experienced neck or shoulder pain. Computer vision syndrome which is a group of related ocular symptoms associated with excessive screen time usage is mainly caused by accommodative (blurring of vision myopia or double vision) or ocular surface problems. Ocular surface mechanisms lead to dryness of eyes, redness and burning sensation. The multifactorial etiology for these set of symptoms include reduction in blink rate, corneal dryness or increased surface of cornea exposure caused by horizontal gaze at the computer screen.¹⁹ Staring at the screen for long time periods causes people to blink less which leads to dryness in the eyes. Sawhney et al in their survey found that 86.5% students felt eye strain and 60% experienced eye dryness and irritation; 65% of students complained of body pain and 90% reported not maintaining proper posture.⁹ In the present study, half the respondents experienced focussing problems, 35% students complained of dry eye and 28.1% had photophobia. Insufficient physical activity has several adverse consequences including development of obesity which can further lead to coronary heart disease, cancers and diabetes later in life.²⁰ The present study found a significant change in physical activity patterns in medical students during online learning with 54% students doing less than 30 minutes of moderate activity per week and 55% doing even less than 15 minutes of vigorous activity in a week. These results are in line with findings of previous studies.^{21, 22, 23} Jajat AS measured students' physical activity during online learning in Indonesia and found that only 48% of students met the WHO physical activity recommendations.²⁴ Recently, Chu Y-H(2022) who surveyed 181 Taiwanese university students also found a significant reduction in physical activity of various intensities with on line learning mode with a more significant decline in activities with lower intensity.²⁵

CONCLUSION

Screen time of the students has increased in the present day and has led to deleterious effects on all aspects of their health including physical, emotional and mental well-being. Though the pandemic is over but nevertheless it has taught some very important lessons. Importance of maintaining an active lifestyle and reducing sedentary behaviour is of utmost importance to prevent long term consequences on health. It is also equally important to carefully monitor the effect of increasing screen time on the emotional and mental health of the students which most of the times can be subtle and insidious. Though it may not be possible to avoid screen time completely but preventive strategies should be put in place by universities following the online mode of learning to improve physical activity and mental health of the students. Modification in the ergonomics of the working environment, more opportunities for physical activity through incorporation of simple exercises and postural advice, recommendations for screen time limits and wellness counselling should form an important component of virtual classrooms.

Declaration by Authors

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