

Impact of Increased Screen Time and Its Association with Dry Eye among MBBS Students During COVID 19 Pandemic

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Abstract

Background: Due to increase in screen time during COVID 19 pandemic, increased incidence of dry eye was seen in MBBS students.

Methods: This study was conducted on MBBS students aged 18-25 years as an online survey in the year 2021. Data was collected on the structured questionnaire and Ocular Surface Disease Index (OSDI).

Results: Out of 400 MBBS students, 173 were male, and 227 were females. Mean age was 21.28 ±4.27 years ranging from 18- 25 years. The impact of increased screen exposure time on the dry eye of students was statistically significant (P =0.0151).

Conclusion: Our study showed a significant relationship between increased screen time and the dry eye disease among MBBS students. Awareness about the prevention of digital eye strain needs to be stressed.

Keywords: MBBS students, pandemic, screen time, dry eye symptoms, OSDI score

Introduction

Social isolation because of the coronavirus (COVID-19) virus had forced MBBS students to use electronic devices such as laptops, desktops, mobile and tablets for continuous learning, working, and socializing. The long-term effects of increased screen time on physical and mental health are still unknown. Before COVID-19, the negative impact of prolonged screen time on the ocular

surface was known.^[1] It has been reported that the increased use of electronic devices needed during the pandemic will exacerbate this problem.^[2] In India, where COVID-19 continued to overwhelm the health care system, a study on 407 people (average age 27.4 years) through social media platforms found that the average increase in screen time during lockdown was 4.8 ± 2.8 hours per day, resulting in an average screen time usage of 8.65 ± 3.74 hours per day.^[3] Not surprisingly, 95.8% of respondents experienced symptoms of dry eyes like foreign body sensation, itchy eyes, pain, redness, dryness, blurred vision related to digital device usage and 56.5% reported an increase in symptoms frequency and intensity during the lockdown. This is also true for patients of all ages and professions. Before COVID-19, in 2018, it was reported that 68% of children used a computer by the age of 3 and 37% of adults aged 60 years and older, spend five or more hours daily on digital devices.^[4]

Dry-eye syndrome is a chronic disorder of the ocular surface that can affect the quality of life of an individual. It is defined as a multifactorial disease of the tears and ocular surface that results in symptoms of discomfort, visual disturbance, and tear film instability with potential damage to the eye.^[5] One of the etiology of dry eye is increased screen time; working on a computer monitor, laptop or digital display for hours.^[6]

Individuals with dry eyes cannot perform certain activities such as reading, driving and computer-related work, which require accurate visual attention and will affect their quality of life.^[7] Even 4 hours per day usage has led to the risk of developing dry eye.^[8] Often, symptoms are not recognized by an individual and are detected only on ophthalmic examination.

The increase in dry eye disease associated with digital devices use is reversible in many cases. In 2014, a study was done on smartphone use and dry eye signs and symptoms in children in South Korea and was found that both signs and symptoms resolved after four weeks of stoppage of screen time.^[9] They also found that time spent outdoors was protective against dry eye disease, giving us another reason to spend more time outside after spending more than a year of too much time indoors.

The most important advice we can provide to our patients with dry eye symptoms is to reduce their time on electronic devices and seek alternative natural modalities for working, learning, and socializing. Unfortunately, the prolonged use of Visual Displayed Terminals (VDT) may predispose to ocular surface disorders, such as dry eye disease (DED) which are associated with visual symptoms (e.g., eye strain). Although DED is among the most common eye diseases worldwide, its impact on patients' overall health is often underestimated. The dry eye changes the precorneal tear film's regularity and dynamics. Vision deterioration and the changes in optical quality in patients with DED affect quality of life adversely.

Digital eye strain is manifested by evaporative dry eye caused by decreased and incomplete blink rate leading to ocular surface compromise and asthenopic symptoms which causes constant state of accommodation and convergence.^{[10][11]}

Other environmental factors, such as poor ergonomics, improper lighting, glare, and decreased humidity in air-conditioned rooms, worsen these symptoms.^[12] While working on computers, the gaze angle tends to be higher than what every day near work usually demands;^[11] the palpebral aperture is vertically larger, leading to faster

evaporation further aggravated by incomplete blinking. Incomplete blinking does not distribute the tear film properly, resulting in an unstable tear film which, coupled with an inadequate lipid layer leads to dryness, grittiness, foreign body sensation, burning, and itching of the eyes.^[13]

Materials and Methods

This observational study was conducted on MBBS Students in the age group of 18-25 who participated in an online survey in 2021. Data was collected with the help of a self-structured questionnaire along with the Ocular Surface Disease Index (OSDI).

Detailed information was obtained about the dry eye symptoms and the duration of increased screen time during the COVID-19 crisis, i. e, online classes, video calls, webinars, video games, social media, and online streaming platforms.

This questionnaire also got more information about participants' precautions for increased screen time, such as plain/antiglare glasses, screen filters, room illumination, and decreased screen brightness.

The OSDI questionnaire had 12 items, with each question given a score ranging from 0 (none of the time) to 4 (all the time).

The patients had to assign a score based on the duration of symptoms experienced over the preceding week. The final score was calculated by multiplying the sum of all the scores by 25 and dividing the total by the number of questions answered.

Scores ranged from 0 to 100; they were 0-12 normal, 13-22 mild, 23-32 moderate, and ≥ 33 severe dry eye disease.

This survey was conducted during the lockdown period during the covid pandemic, the period when many states had announced lockdown and the upsurging of COVID-

19 cases when it was not possible to do a community-based sampling. We decided to collect data online by Google form.

Participant's consent

Informed consent was obtained from all individual participants included in the study. Willing participants between 18-25 years of age from different medical colleges were included in this study.

Inclusion Criteria

- a) MBBS students willing to participate
- b) Age group 18-25 years

Exclusion Criteria

The participants below 18 and above 25 years are excluded. The participants who left the questionnaire forms incomplete were also excluded. Patients having a history of Keratoconjunctivitis sicca, Sjogren syndrome, Ocular surface inflammation, and viral keratitis and those having previous dry eyes were excluded.

Duration of the study: Duration of the study was from June 2021 to August 2021, (173 males ,227 females).

Statistical analysis

The data was recorded in excel sheet and analyzed using SPSS Version 25. The categorial variables were defined using percentages. Chi-Square (χ^2) test was employed for testing the significance of difference between separate categories with respect to manifestations of dry eyes. A probability (p) values was calculated and considered as

p-value	Result significance
> 0.05	Statistically not significant
Between 0.05 to 0.01	Statistically significant
Less than 0.01	Statistically highly significant

Table 1: Questionnaire placed before participants Ocular Surface Disease Index© (OSDI©).

Table 2

Have you experienced any of the following during the last week:						
	All of the time	Most of the time	Half of the time	Some of the time	None of the time	
1. Eyes that are sensitive to light?	4	3	2	1	0	
2. Eyes that feel gritty?	4	3	2	1	0	
3. Painful or sore eyes?	4	3	2	1	0	
4. Blurred vision?	4	3	2	1	0	
5. Poor vision?	4	3	2	1	0	
Subtotal score for answers 1 to 5					(A)	
Have problems with your eyes limited you in performing any of the following during the last week:						
	All of the time	Most of the time	Half of the time	Some of the time	None of the time	
6. Reading?	4	3	2	1	0	N/A
7. Driving at night?	4	3	2	1	0	N/A
8. Working with a computer	4	3	2	1	0	N/A
9. Watching TV?	4	3	2	1	0	N/A
Subtotal score for answers 6 to 9 (B)						
Have your eyes felt uncomfortable in any of the following situations during the last week:						
	All of the time	Most of the time	Half of the time	Some of the time	None of the time	
10. Windy conditions?	4	3	2	1	0	N/A
11. Places or areas with low humidity (very dry)?	4	3	2	1	0	N/A
12. Areas that are air conditioned?	4	3	2	1	0	N/A
Subtotal score for answers 10 to 12					(C)	
Add subtotals a, b, and c to obtain d d = (sum of scores for all questions answered) X 25/ (Total number of questions answered)					(D)	

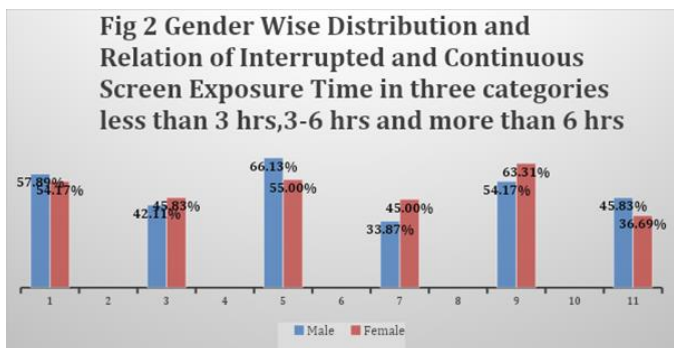
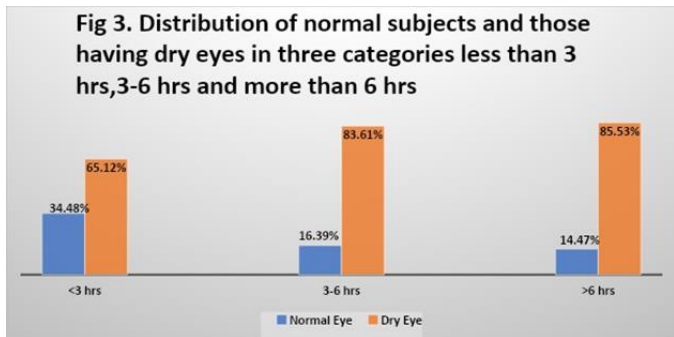
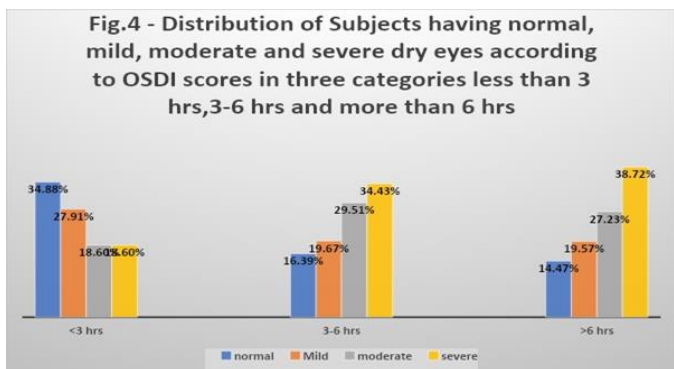


Figure 2:



Chi square test: p=0.0151

Figure 3:



Chi Square test: p value=0.0047

Results

The study was conducted on 400 MBBS students in the age group between 18 to 25 years (173 males ,227 females).

In 3 hours of exposure males who worked interrupted were 57.89% and who worked continuous were 42.11% and females were 54.17% and 45.38% respectively, in 3-6 hours exposure time males who worked interrupted were 66.13% and females were 55%, who worked continuous were 33.8% and females were 45%, in more

than 6 hours exposure males who worked interrupted were 54.17%, females were 63.31% and males who worked continuous were 45.83%, females were 36.69% [Figure 2]. It was not statistically significant. The subjects having symptoms like itching, grittiness, redness, dryness, foreign body sensation, blurred vision, and painful eyes were classified to have dry eyes.

Figure 3 shows that distribution of normal subjects and those having dry eyes in three categories less than 3 hrs,3-6 hours and more than 6 hours was found significant [0.0151] which shows that duration of exposure of screen time caused a statistically significant difference in appearance of symptoms of dry eyes.

Figure 4 shows distribution of subjects having normal, mild, moderate, and severe dry eyes according to OSDI scores in three exposure categories that is 3hours,3-6 hours and 6 hours.

In 3 hours of exposure 34.88% were normal subjects, 27.91% were mild dry eyes ,18.6% were moderate and 18.6% were severe dry eyes. In 3 to 6 hours of exposure, 16.39% were normal, 19.67% had mild dry eyes, 29.51% had moderate and 34.43% had severe dry eyes.

In 6 hours of exposure 14.47% were normal subjects ,19.57% had mild dry eyes ,27.23% had moderate and 38.72% had severe dry eyes. This shows that relation between screen exposure time and dry eyes was statistically significant (0.0047).

Discussion

With the advent of novel coronavirus, sudden increase in usage of digital devices was seen; overall, number of hours of screen time increased. The screen time included online calls, meetings, lectures, assignments, and work from home. Our study showed a significant effect on ocular health (dry eye) due to increased screen time during a pandemic. No significant association was found

between screen time exposure as regards age or sex was concerned. We have seen that due to COVID-19, increase in ocular surface disease caused by the rise in screen time was significant.

Now is the time to address the modifiable risk factors for dry eye. The decreased blink rate is the primary mechanism for worsening dry eyes. The blink rate decreased from 18.4 blinks/min before computer use to 3.6 blinks/min during computer use.^[14] In spite of COVID-19 restrictions lifted the use of computers, smartphones, tablets, and other electronic devices will continue.

To prevent dryness, in addition to limiting the overall digital screen exposure, people should take break at regular intervals. They may close their eyes intermittently, apply a teardrop, or look away at a distance beyond 20 feet after every 20 minutes for 20 seconds (use the 20, 20, 20 rule). Devices preferably should have downward location.^[15] A study on co relation between smartphone use and dry eye signs and symptoms in children in South Korea found that both signs and symptoms resolved after four weeks of screen time cessation.

Our study highlights that the increase in the use of digital devices after the COVID-19 lockdown, had led to deterioration of ocular health across young age groups, especially medical graduates. Measures are called for to disseminate awareness about the prevention of digital eye strain.

Conclusion: Our study highlights that Covid 19 pandemic and lockdown had a significant impact on' ocular health of MBBS students. They have experienced dry eye symptoms like itching, grittiness, redness, dryness, foreign body sensation, blurred vision, and painful eyes. Now the restrictions are lifted in most parts

of the world, and situation is coming back to normal, but public must be educated not to continue their habit of using digital devices for a prolonged period and use preventive measures like antiglare glasses, 20-20-20 rule and keeping device at downward position.

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