



A study to assess the impact of increased screen time during COVID-19 pandemic on eye health

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ABSTRACT

The COVID-19 pandemic led to a dramatic rise in usage of digital platforms thus increasing screen time. The continued usage of e-devices is associated with many adverse effects like dry eyes, blurring of vision, reduced concentration span, headache. The purpose of this research was to analyse the impact of increased screen time during COVID-19 on eye health among general population and to create awareness about the suitable usage of e-devices.

The objective of the study was to determine the effects of increased screen time, analyse the dependence on e-devices and test the awareness regarding eye health in the general population during COVID-19. A descriptive survey-based study was conducted in general population of the age group of 15-25. A self-generated questionnaire was used to assess the impact of screen time on eye health during COVID-19 after appropriate validation. This study was conducted in the month of July 2020 for a period of 1 month. A total of 181 participants took part in the study. 92.8% of the participants spent greater than four hours on screen media. 48.1% had faced vision problems during this period. Most of the users experienced headache during lockdown period. 81.8% believed that there was a change in their sleep pattern as compared to pre-COVID period. The study points out that common people should be made aware of the adverse effects associated to the excessive use of screen time on health both physical and mental wellbeing.

INTRODUCTION

COVID-19 has severely affected our social life and replaced the human contact with an electronic connection.¹ Screen time denotes the total time spent and the various activities performed online using digital devices which includes; using digital devices for work or educational purpose and leisure/entertainment.⁶ The effect of increased digital screen time due to lockdown and quarantine on eye health globally has mainly been ignored as most of the research has been fixated on SARS Cov-2.³ The increased use of electronic devices (e-devices) and its influence on well-being of users is a concern to healthcare practitioners.¹ According to the American Optometric Association, the most common symptoms associated with DES are eyestrain, headaches, blurred vision, dry eyes and pain in the neck and shoulders.⁸ Asthenopia expresses itself with complaints such as eye discomfort, tearing, dryness, blurred vision, inability

to focus, foreign body sensation.¹⁰ Multiple studies have found a strong link between heavy social media use and an increased risk for depression, anxiety, loneliness, self-harm, and even suicidal thoughts.¹⁴ A study conducted in the UK found that the participants spent an average of 7.2 hours as screen time, which was greater in younger adults aged below 34 years paralleled to those aged 65 years or above.⁷ Digital blue light emitted from e-devices influences the circadian rhythm and sleep. Though the screens of modern e-devices have an in-built protective mechanisms to avoid eye damage, its increased duration of use leads to DES symptoms. It also has shown to suppress production of melatonin from pineal gland, thus affecting quality of sleep and also delaying onset of sleep.¹ In a study conducted in the US among 2-17 year olds, it was found that moderate use of screens (4 hours/day) was associated with lower psychological well-being, lower curiosity, decreased self-control, more

distractibility, difficulties in making friends, less emotional stability, being more difficult to care for, and incapability to complete tasks.³ Studies suggest effects like increased temperature, hypersensitivity, facial dermatitis, burning sensation of facial skin and behind the ear after exposure to mobile phones.⁵

Prolonged sitting with poor posture for a long time while using e-devices may contribute to neck, shoulder and back pain. Users must be educated to sit in a correct posture with their back supported, feet supported and placed in front, eyes, forearms and wrist aligned with the e-device at eye level or right below.¹ Dietary supplementation with omega-3 fatty acids have shown beneficial effects on dry eye signs and symptoms as 70% in the treatment group were found to be symptom free after 3 months in a randomised control study. Lubricating eye drops have shown to decrease symptoms such as tiredness, dryness and difficulty focusing during continual computer use, although complete resolution of symptoms may not occur.⁸ Blinking helps in maintaining a normal ocular surface, with most blinks prompting a cycle of secretion, dispersion, evaporation and drainage of tears.⁸ Increased screen time causes drying of the anterior surface of the eye especially the cornea due to decreased blinking rate which may further lead to dry eye syndrome.¹ Blink training may be helpful in the management of DES symptoms.⁸ Using 20/20/20 rule that is for every 20 min look away from the screen for 20 seconds and focus on something 20 feet away helps in reducing eye strain while using an e-device. The screen distance is recommended to be >50 cm.¹ Healthy digital habits like deliberate full blinking exercises, frequent breaks, and generally reduced digital device use must be practiced. Enlarging font size, reducing glare, improving contrast, and using a downward gaze may also be helpful for those with symptoms of dry eye as well as help in its prevention.⁹

Although these disorders may be increased during the COVID-19 pandemic, the issue of prolonged screen time is here to stay and hence we must take the necessary precautions in order

to prevent it.

MATERIALS AND METHODS

This study assessed the impact of increased screen time in the COVID-19 pandemic lockdown period. It aimed to bring to light any symptoms related to eye health that the general population were facing specifically during this period as well their dependence to e-devices. A descriptive survey based study was conducted using a self-generated and validated questionnaire. The study site involved two states of India ie. Karnataka and Kerala. This study was conducted online by using Google forms for data collection. The study period was from July to August, 2020. An informed consent form was obtained from the participants prior to attempting the questionnaire. Demographic characteristics were determined in this study. 13(Thirteen) questions were asked in this questionnaire regarding the participant's eye health which included amount of time spent on e-devices, its dependence rate, symptoms faced, breaks in between screen time, binge watching, blinking, etc. Participants who were aged 15-25 were included. Those older than 25 years and those who were unwilling to participate were excluded. The collected data were entered in Microsoft Excel and analysed using descriptive and inferential statistics by using SPSS software (IBM SPSS statistics 7 Trial).

RESULTS

DEMOGRAPHIC INFORMATION

A total of 181 participants who satisfied the inclusion and exclusion criteria were employed in the study. Majority of the participants were females (81.8%) which was followed by 18.2% males. 47% participants were under graduates, 28.7% being post graduates, 21.5% were professionals and 2.8% were high schoolers. Most of the participants belonged to 21 years age group (32.6%) followed by 22 years age group (26%).

Table 1 : Demographic characteristics

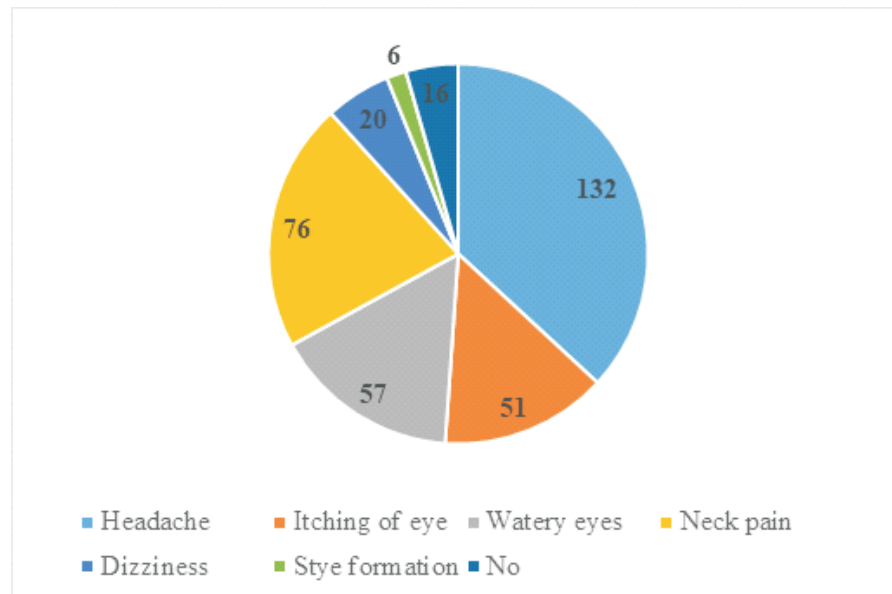
Gender wise distribution		
Gender	Frequency	Percentage (%)
Male	33	18.2%
Female	148	81.8%
Qualification wise distribution		
Qualification	Frequency	Percentage (%)
High School	5	2.8%
Under graduate	85	47%
Post graduate	52	28.7%
Professional	39	21.5%

Table 2 : Awareness and practice related to eye health

Statement	Yes	No
Spend more than 4 hours/day on screen media.	92.8%	7.2%
Problem with vision during this lockdown period.	41.8%	51.9%
Taking breaks while on e-devices good for eye health.	97.2%	2.8%
Less blinking rate causes dryness of eyes.	76.3%	23.8%
Usage of protective eye wear while using e-device.	79%	21%
HTN, DM and hyperlipidaemia affect eye health.	76.2%	23.8%
Change in sleep pattern compared to pre-COVID period.	81.8%	18.2%

Table 3 : Symptoms on increased usage of e-devices

Symptoms experienced while using an e-device	Number of responses
Headache	132
Itching of eye	51
Watery eyes	57
Neck pain	76
Dizziness	20
Stye formation	6
No	16

**Fig 1 :** Symptoms on increased usage of e-devices

IMPACT OF INCREASED SCREEN TIME ON EYE HEALTH INFORMATION

92.8% spent more than 4 hours per day on screen media. 58% agreed that 'increased screen time affected their physical, mental and social well-being' which was followed by 33.7% who strongly agreed to this statement. 51.9% did not face any problem

with their vision during the lockdown period. When asked regarding the symptoms experienced while using an e-device, majority of the participants responded with "headache" (72.9%). This was followed by neck pain (42%), watery eyes (31.5%), itching (28.2%), dizziness (11%) and stye formation (3.3%). 97.2% had a positive attitude regarding taking breaks during

usage of e-devices. Most of the participants faced problems in lockdown like “little interest in doing things” (39.8%), feeling tired (39.2%), trouble concentrating (29.3%), feeling down (27.6%), poor appetite (23.8%), depressed/hopelessness (18.8%) , thoughts of hurting oneself (7.2%). Majority of the participants

were aware regarding reduced blinking rate while using e-device caused dryness of eyes (75.7%). 79% of the participants did not use any protective wear while using an e-device. 76.2% were aware regarding the effect on eye health due to hypertension, diabetes mellitus and hyperlipidemia. 77.3% 'strongly agreed' to

Table 4 : Problems faced during lockdown

Problems faced during lockdown	Number of responses
Little interest in doing things	72
Feeling down	50
Depressed/hopeless	34
Feeling tired/low energy	71
Poor appetite/overeating	43
Trouble concentrating	53
Thoughts of hurting yourself	13
No	48

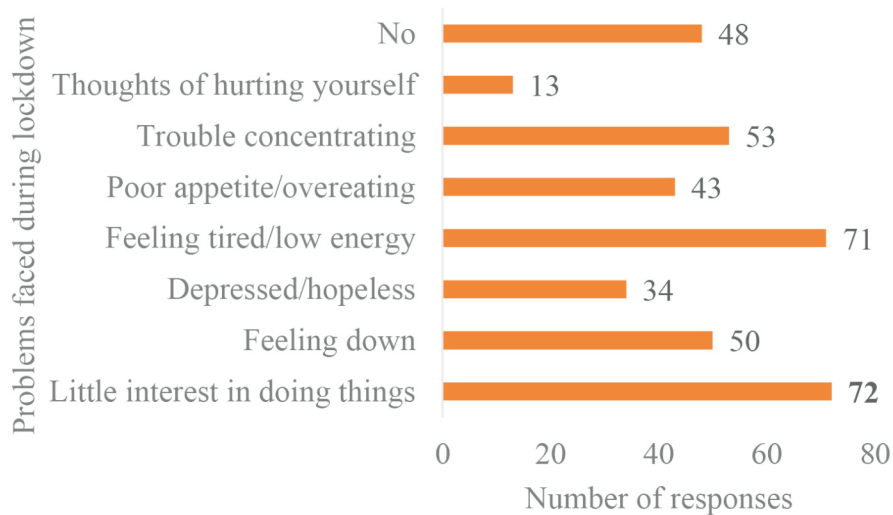


Fig 2 : Problems faced in lockdown

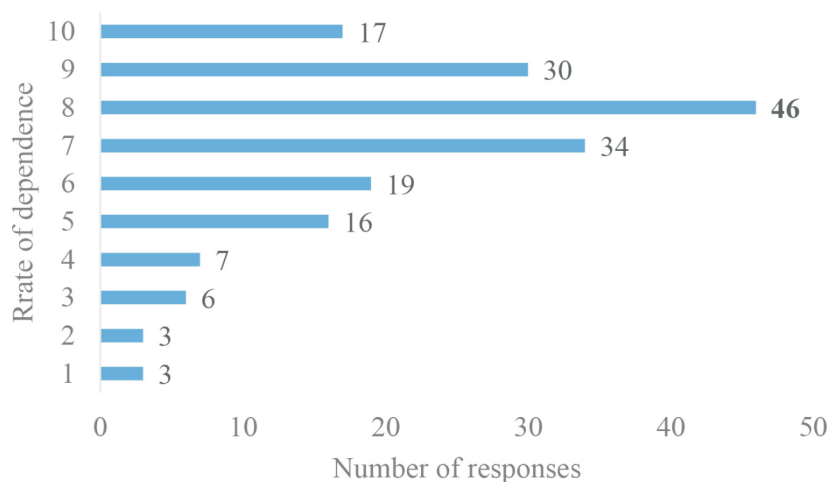


Fig 3 : Rate of dependence on e-devices

the statement regarding 'binge watching could affect eye health'. This was followed by 22.7% who 'agreed' to this statement. It was alarming to notice that 81.8% participants had noticed a change in their sleep pattern as compared to pre-COVID-19 period. When asked to rate their dependence to devices on a scale of 1-10, the majority of the participants answered with an 8 (25.4%) followed by 7 (18.8%) followed by 9 (16.6%).

DISCUSSION

The present study aimed to assess the impact of increased screen time during COVID-19 pandemic on eye health.

In our study, majority of the participants complained of headache (72.9%), followed by neck pain (42%), watery eyes (31.5%), itching (28.2%), dizziness (11%) and styte formation (3.3%) while using an e-device for a long period of time. Similarly, in a previous study conducted by Veena PS et al, headache was the most commonly identified problem (62.5%) followed by pain in eyes (48.8%).¹⁰ 58% participants in our study agreed that 'increased screen time affected their physical, mental and social well-being.' The results of a study conducted in Canada indicated that avoiding excessive screen time and engaging in exercise, mainly outdoors, were key behaviours related with better observed mental and overall health during the COVID-19 pandemic.¹¹ Bhattacharya S et al revealed that digital eye strain (DES) or computer vision syndrome was on the rise due to increased time exposure to digital screens of e-devices during online classes.¹⁵ In our study it was found that 92.8% spent more than 4 hours per day on screen media. A study conducted among college students during lockdown period showed that the overall e-device usage increased by 5 hours, increasing screen time up to 17.5 hours/day for heavy users and an average of 30 hours/week for non-heavy users.¹² As per our study results, 97.2% had a positive attitude regarding taking breaks during usage of e-devices. In case one exceeds continuous use of screen time by 2 hours, a 15-minute break is suggested. The recommended screen distance should be >50 cm.¹

Blinking aids maintenance of a normal ocular surface.⁸ Majority of the participants in our study were aware regarding reduced blinking rate causing dryness of eyes. Reduced blink rate with computer use has been observed in many studies and may be applicable to dry eye symptoms that usually occur with DES.^{4,13}

In our study, 81.8% participants had noticed a change in their sleep pattern as compared to pre-COVID-19 period. Similar results were found in a study conducted by Veena PS et al where, 76.1% participants had reported to have a major change in their sleep interval after onset of COVID-19 pandemic.¹⁰ Majority of the participants in our study did not use protective eye wear while using an e-device. However, use of protective eye wear is recommended in order to reduce the hazardous effects of increased screen time. Computer vision spectacles include anti-fatigue or accommodative support lenses. Glasses with antireflection coatings can help to reduce discomfort from the glare of the e-device. Blue-blocking lenses have recently been recommended.¹

CONCLUSION

The present study was done to assess the impact of increased screen time on eye health among general population during COVID-19 pandemic lockdown period. Most of the participants spent greater than four hours on an e-device. The findings in this study revealed that lockdown had a negative impact on the eye health. Participants need to be educated about eye health in order

to prevent eye related disorders in the future and to maintain the quality of life. The study points out that common people should be made aware of the adverse effects associated to the excessive use of screen time on health both physical and mental wellbeing. The appropriate usage of e-devices can help go a long way in maintaining health of individuals.

CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest.

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