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IMPACT OF INCREASED DIGITAL SCREEN TIME (DST) ON EYE HEALTH IN UNDERGRADUATE MEDICAL STUDENTS

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ABSTRACT Digital media offer both benefits and significant risks to the health of individuals. Increased digital screen time (DST) has impacted physical, mental and behavioral pattern of individuals. Present study was undertaken to assess the effect of increased screen time and other associated factors on ocular health in under-graduate medical students. A self-reported, close-ended questionnaire was sent through Google forms to all the undergraduate medical students. The questionnaire assessed participants' screen exposure time, intermittent break frequency, myopia progression, symptoms and measures to overcome the symptoms. A total of 386 students completed the survey; 279 were females and 107 males. Overall, 49% in the study group had vision related problems; 164 had spectacles, 21 had contact lenses and 4 had undergone LASIK surgery. In significant number of students (n=131) myopic progression was noted during the course. Smartphone was the commonest device used (n=306, 79.3%) followed by Tablet/iPad (n=31, 8%) and laptop (n=3, 0.8%); 46 students (12%) use multiple gadgets on a routine basis. 202 students (52.3%) spend >6 hrs./Day with the devices. Majority (n=311,80.6%) take a break between every 30 minutes-1 hour. The most common symptom was dryness of eyes (n=137,35%), followed by headache (n=127,33%). While the symptoms were reported to be occasional in majority of the subjects, in 20 subjects these symptoms were reported to be persistent. With more than 90% of the participants reporting any of the symptoms related to extended screen time exposure, it is an issue of serious concern and should be considered as an emerging health problem.

KEYWORDS : Digital screen time, eye health, smartphone, myopia, dry eye

INTRODUCTION

Digital devices are seen as a crucial element of life for the current generation. The swift progress in technology has enabled consumers worldwide, irrespective of their age, to enjoy a plethora of choices with similar access, practically anywhere through mobile devices, leading them to spend longer hours on screens than the recommended two to three hours daily. With the rise of modern smartphones, tablets, and computers, the Internet is instantly available to the general public at their fingertips.

India is the largest and fastest-growing market for digital consumers, with 692 million internet subscribers and 467 million active social media users in February 2023 [1]. The introduction of the government's Digital India initiative has resulted in a dramatic increase in internet usage with approximately 47.5% of the population having access to the internet in 2023 compared to 4% in 2007 [2]. Despite this giant leap in exposure to digital screens in India, except for the pediatric category, no recommendations are currently available on screen viewing and its effects [3].

There is undoubtedly an increase in the use of digital devices among young people for both educational and recreational activities. Although internet use is approaching concerning levels, many studies have pointed out the harmful consequences of its usage, including problems related to sleep, emotions, behaviour patterns, and social interactions[4].

The present study is undertaken to understand the practices of digital screen use and its impact on ocular and general health in undergraduate medical students of Dr. S.S. Tantia Medical College, Sriganganagar.

MATERIALS AND METHODS

Present study is based on a self-reported close-ended 10-item questionnaire generated through Google form and sent to participants between February to April 2025. The study was aimed at all undergraduate medical students who were willing to give consent to participate in the survey. A total of 386 Undergraduate students took part in the study. Those with any congenital eye disease were excluded from the study. The questionnaire was designed in English language only since all participants were conversant with the language. The study was approved by the Institutional ethics committee and a written informed consent was obtained from all the participants. The questionnaire included the following details- demographic details, total number of hours spent with the device and total number of hours spent on reading, break duration and frequency, complaints related to eye and general health, and measures taken to overcome strain. If the questionnaires were incomplete, they were excluded from the study. The association was studied by Fisher exact test and P value of <0.05 was considered significant.

RESULTS

A total of 386 responses were considered for analysis. The demographic and clinical details of the participants along the types of devices used are given in Table 1. The mean age of the participants who took the survey was 23 + 4 years. There were 279 (72.3%) females and 107 (27.7%) males. None of the participants had history of any surgery or any pre-existing eye related problems. Among the participants,164 had spectacles; 21 had contact lenses and 4 had undergone LASIK surgery; Overall 49% in the study group had vision related problems. Smartphone was the commonest device used (n=306, 79.3%) followed by Tablet/iPad (n=31, 8%) and laptop (n=3, 0.8%); 46 students (12%) use multiple gadgets on a routine basis. Majority (202/386, 52.3%) of the participants spent >6 hrs./day with the devices. Most of the students (n=311,80.6%) took break between every 30 minutes-1 hour (Table 2).

Table 1. Demographic Details Of 386 Undergraduate Students Who Took Part In The Online Survey

Detail	Number	Percentage
Total	386	-
Males	107	27.7
Females	279	72.3
Number of students		
With spectacles	164	42.3
With contact lenses	21	5.4
LASIK surgery	4	1.04
Type of device		
Smart phone	306	79.3
Ipad	31	8.0
Laptop	3	0.8
Multiple devices	46	12.0

Table 2. Total Time, Time Spent For Reading And The Duration Of Breaks

Total DST (hours)	Number	Break time (hours)	Number	Total DST (hours)*	Number	Moderate to severe myopic progression
<3	23	0.5	143	<6	184	14
3-5	161	1	168			
6-8	184	2-3	58	>6	202	48
>8	18	>3	17			

*Total DST>6hours versus<6 hours P value- <0.05- SIGNIFICANT.

Ocular/nonocular complaints:

In significant number of students (n=131) myopic progression was noted during the course; 69 were mild, 37 moderate and 25 were of severe category. When we compared moderate to severe myopic progression versus total DST time, the difference was statistically significant. The most common symptom was dryness of eyes (n=137,35%), followed by headache (n=127,33%). Other symptoms included blurred vision (n=78, 20.2%), pain and redness (n=73,18.9%); more than one symptom was observed in 50 (13%) of patients and 21(5.4%) patients had no symptoms. While the symptoms were reported to be occasional in majority of the subjects, in 20 subjects these symptoms were reported to be persistent. 58 (15.03%) subjects had to visit an Ophthalmologist for the above complaints.

DISCUSSION

The present study was undertaken to dissect out the different attributes in terms of type of device, duration, break time and overall impact of extended use of these devices on ocular health. The important findings are-

1. About 80% of the students showed myopic progression; approximately half of which were moderate to severe category.
2. Around 80% of the students use smartphones; more than 50% of these students watch smartphones for more than 6 hours a day.
3. The commonest symptoms were dryness of eyes (35%), headache (33%), blurred vision (n=78, 20.2%) and pain and redness (18.9%).

Nearly 80% of the students were using smart phones for various applications. The smartphone offers a variety of applications through its operating system, significantly broadening its use beyond the original purposes of making calls and sending messages. A systematic review conducted by Jaiswal et al. has demonstrated that smartphone usage can have a notable negative effect on eye health[5]. Common symptoms experienced by children who use smartphones for prolonged periods include headaches, eye strain, dry eyes, and soreness[6]. Most participants indicated they spent over 6 hours a day on their devices. Prolonged screen time is a major factor contributing to dry eyes. A study in Egypt revealed that IT professionals who spent more than 6 hours daily on their computers began to experience symptoms of dry eyes, with 80% reporting headaches, 70% experiencing blurred vision, and 76% suffering from burning eyes.[7]

Another important observation in the present study is myopia progression seen in vast majority of the participants. Myopia is currently considered as one of the main public health problems worldwide [8].A clear association was observed between DST and myopic progression in the present study The most common symptom reported in our study was dry eye affecting 35% of the participants. Continuous staring at the screen leads to a decrease in the blink rate, causing strain in the eyes. Smartphone use is more commonly associated with dry eye disease than other digital devices [9]. Headache was second common symptom reported in our survey with a prevalence of 33%.

While symptoms can be similar across various devices, the intensity of negative effects might differ between them due to variations in screen size, distance from the screen, usage method, brightness, and type of activity. Currently, there are no documented studies examining the differences in symptoms linked to specific devices. One limitation of this research is that the information was gathered through a self-reported survey, and respondents may have either underestimated or overestimated both their screen time and any related symptoms, although significant effort was made to provide support during the survey process. Additionally, the clinical symptoms described by participants were not verified to determine if they were indeed connected to prolonged screen use.

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