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EFFECT OF INCREASED DIGITAL SCREEN TIME (DST) ON OCULAR HEALTH IN UNDERGRADUATE MEDICAL STUDENTS

Ophthalomology

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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=131,80%) myopic progression was noted during the course; 69 were mild, 37 moderate and 25 were of severe category. 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 head ache (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, ocular health, undergraduate medical students, eye health, smartphone

1.INTRODUCTION

Digital devices are considered one of the fundamental aspects of existence of the current generation. Rapid advancements in technology have made possible for consumers in any part of the world, regardless of age, to experience wide options with similar accessibility, practically anywhere via mobile devices, forcing them to indulge in the use of screens for longer than the suggested two-three hours per day. With the advent of new-age smartphones, tablets, and computers, the Internet is readily accessible to the general population at its 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 certainly an upsurge in the use of digital devices amongst the youth both for academic and non-academic purposes. While the usage of the internet as a whole is reaching medically alarming levels, there are numerous reports which have highlighted the detrimental effects of its usage, such as issues that of sleep, mood, behavioral patterns and communal 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 a private medical College in Mangalore.

2. MATERIAL AND METHODS

Present study is based on a self-reported close-ended 10-item questionnaire generated through Google form and sent to participants between July and September 2023. 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

3.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 $\pm$ 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)

Ocular/nonocular complaints:

In significant number of students (n=131,80%) myopic progression was noted during the course; 69 were mild, 37 moderate and 25 were of severe category (Figure 1). When we compared moderate to severe myopic progression versus total DST time, the difference was statistically significant (P<0.05) (Table 2). The most common symptom was dryness of eyes (n=137,35%), followed by head ache (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.

4. 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 I. About 80% of the students showed myopic progression; approximately half of which were moderate to severe category ii. Around 80% of the students use smartphones; more than 50% of these students watch smartphones for more than 6 hours a day iii. The commonest symptoms were dryness of eyes (35%), head ache (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 has a wide range of applications under an operating system and thus the scope has expanded from the traditional application of a mobile phone that was originally for making phone calls or sending messages. The systematic review by Jaiswal et al. has clearly shown that smartphone use has significant adverse impact on ocular health [5]. Headaches, eye strain, dry eyes, sore eyes are the common symptoms in children using smartphones for extended duration [6].The majority of participants reported that they spent more than 6 h per day on their devices. One of the main contributing factors for dry eyes is long screen time. In one Egyptian study, they found that information technology (IT) professionals who worked more than 6 h per day on their computers started to have symptoms of dry eyes as 80% of them felt headaches, 70% blurred vision, and 76% burned 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%.

Though there is overlap in symptoms associated with different devices, the degree of adverse effects may be different with different gadgets, since the screen size, distance of the eye from the screen, method, luminance and type of use may vary between different devices. There is no documented data on differential symptoms based on the devices yet.The limitation of the study is that the data was collected through a self-reported questionnaire and that the respondents may have potentially under-or over-estimated the screen time duration or the associated symptoms, though maximum care has been taken to assist during questionnaire intake. Secondly, the clinical symptoms reported by participants were not cross checked to confirm whether the symptoms were actually related to extended screen usage.

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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
Mean age+SD		-
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/Tablet	31	8.0
Laptop	3	0.8
Multiple devices	46	12.0

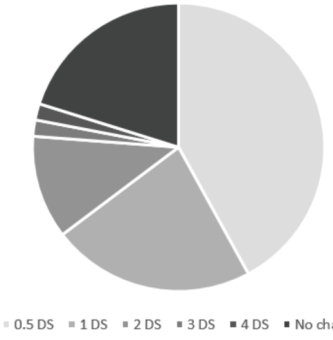

Figure 1. Myopic progression observed in 131 students during undergraduate course

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 (No)
<3	23	0.5	143 (37.1)	<6	184	14
3-5	161	1	168 (43.5)			
6-8	184	2-3	58 (15)	>6	202	48
>8	18	>3	17 (4.4)			

Total DST >6hours versus <6 hours : P value <0.05

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