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Original Research Article

Effect of long-term exposure of digital devices during the COVID-19 pandemic and on ocular health

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ABSTRACT

Background: The study aims to compare the effect of long-term exposure to digital devices during covid-19 and before the lockdown.
Objective: To assess the impact of the lockdown on digital device usage & consequently, the ocular surface health implication related to digital eye strain.
Materials and Methods: An open online survey was distributed to people via social media platforms (email, Facebook, Instagram, WhatsApp, Telegram, and so on).
Result: Females participated more than males, with 58.3%. With 30.76%, the >50 age group was found to participate, and at 13-31 years of age, participation was found to be more with 60%. Most individuals use digital devices for education with 44.2%. Before the lockdown, the duration of digital device usage is not there between 4 to 6 hours, but during the lockdown, it has been increased by 35% due to working from home. 76.3% of participants feel restless due to prolonged use of digital devices.
Conclusion: It was discovered that before the lockdown the duration of digital device usage is not there between 4 to 6 hrs but during the lockdown, due to working from home it has increased and headache as an asymptomatic symptom is noticed more during prolonged use of digital devices in lockdown.

1. Introduction

With time & the advent of technology, the usage of computers, laptops, tablets & smartphones has seen a steady increase in the past few years.[1,2] These digital devices require to be held at a distance that is intermediate between near and distance vision, thereby causing strain on the visual system designed for comfortable near & distance vision. The emergence of the COVID-19 pandemic & the worldwide lockdown has immediately followed by a drastic increase in the amount of time spent on these gadgets.[3–5]

According to the American Optometric Association, as little as >2 hours of continuous digital device usage per day is enough to develop an array of eye & vision-related problems & referred to as "digital eye strain".[4]

Prolonged use of digital devices causes "computer vision syndrome".[1,2,6–8]

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2. Materials and Methods

This study is based on a quantitative, descriptive cross-sectional design with a semi-structured South Delhi population questionnaire. An online survey has been taken by the platform Google forms. Participants are considered from 08 years & too less than 50 years who use digital devices are included as any systemic illness and trauma, were excluded. More than 8 years of age participants were questioned with 16 questionnaires (Table 1) through a survey by online mode via social media platforms through the mail, Facebook, etc. the questions are designed to compare the effect of digital gadgets before and after a lockdown on participants of the South Delhi Population. As a result, questions give the status of Day-to-Day exposure to digital gadgets due to working from home during COVID 19. The responses are providing the level of knowledge about their digital gadget exposure. Participants' information is taken confidentially with informed consent. Ethical approval has been taken by the Institutional ethical committee of Jamia Hamdard New Delhi before the study. The collected data has been studied with statistical analysis that has been done using Microsoft Excel and noted in percentile format by using SPSS software (Table 3). Participants above 8 years of age with normal health, have been taken into the study as Inclusion Criteria.

Table 1: Research questions

1.	Name
2.	Email Address
3.	Phone Number
4.	Gender
5.	Your Age.
6.	Myself (current designation)
7.	The main purpose of most the digital devices usages
8.	Total no. of hours of digital device usage (smartphone +laptop+ Monitor) per day BEFORE the lockdown was implemented.
9	Total no. of hours of digital device usage (smartphone +laptop+ desktop) per day during the lockdown was implemented.
10.	How often do you experience these symptoms?
11.	What is the severity of these symptoms?
12.	Has the frequency or intensity with which you experience these symptoms increased since the lockdown was started
13.	Are you using spectacles?
14.	Is your spectacle power increased during this pandemic
15.	If yes, then what's your previous power & present power of the spectacle. If no, then fill nil answer
16.	Are you feeling stressed or restless due to the prolonged use of digital devices?

3. Result

The survey has completed 156 subjects. In this study, Females participated more than males, with 58.3% (Figure 1). With 30.76%, the >50 age group was found to participate, and at 13-31 years of age, participation was found to be more with 60% (Figure 2). Most individuals use digital devices because of work from home with 44.2% (Figure 3). Before the lockdown, the duration of digital device usage is not there between 4 and 6 hrs but after the lockdown, due to working from home, it has been increased by 35% (Figure 4) as 52.9% of participants feel headaches due to prolonged use of digital devices (Figure 5). 72.3% of participants feel restless due to prolonged use of digital devices (Figure 8). As most of the participants are using spectacles, they seemed to change their spectacle power in COVID 19 with 83% (Figure 7).

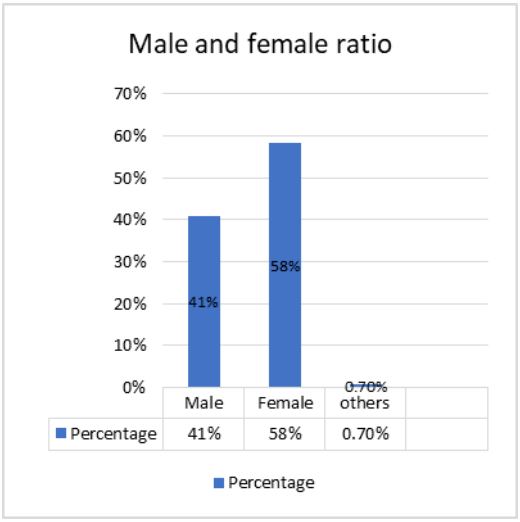

Fig. 1: Results for sex ratio

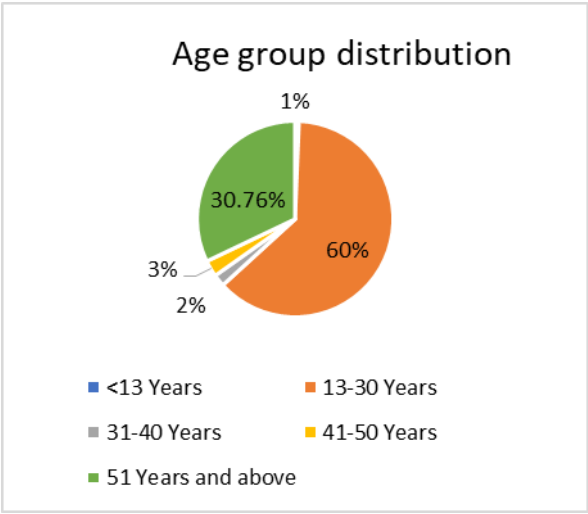

Fig. 2: Results for age distribution

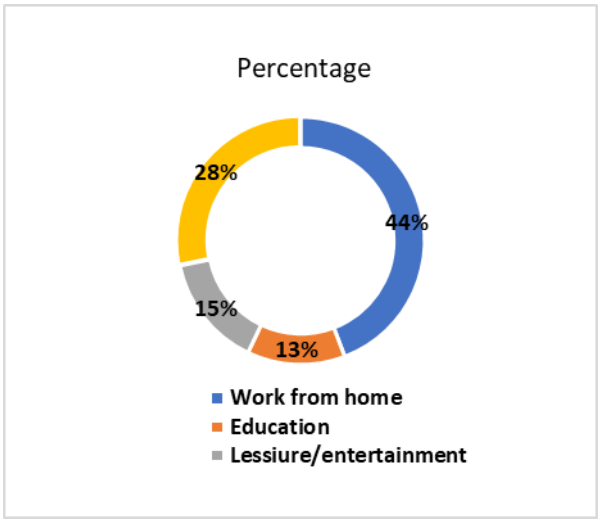

Fig. 3: Results for the main purpose of digital device usage

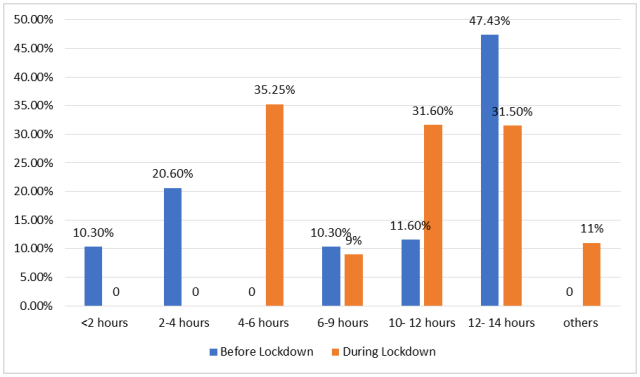

Fig. 4: Result for digital exposure before and during the lockdown

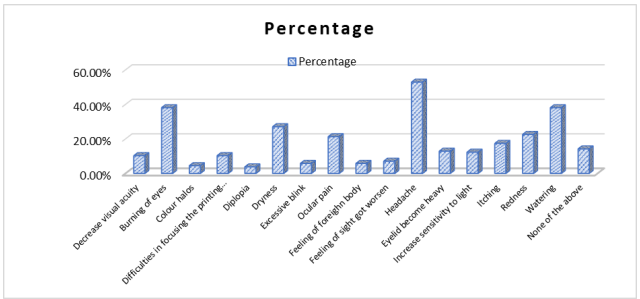

Fig. 5: Results for ocular symptoms in percentile

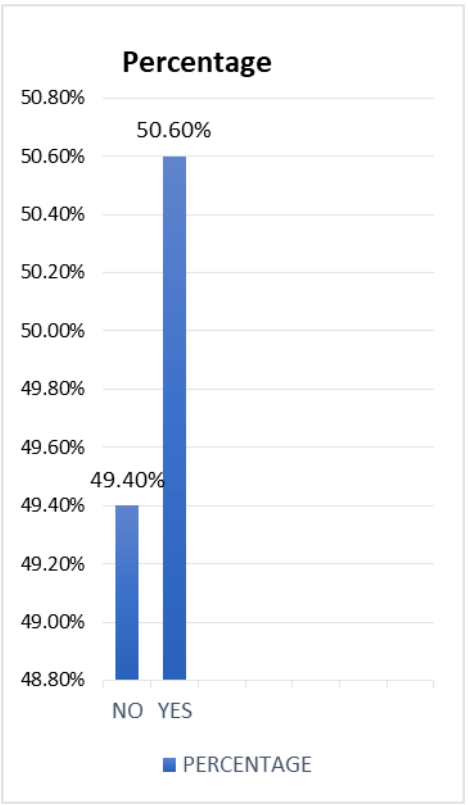

Fig. 6: Result of using spectacle?

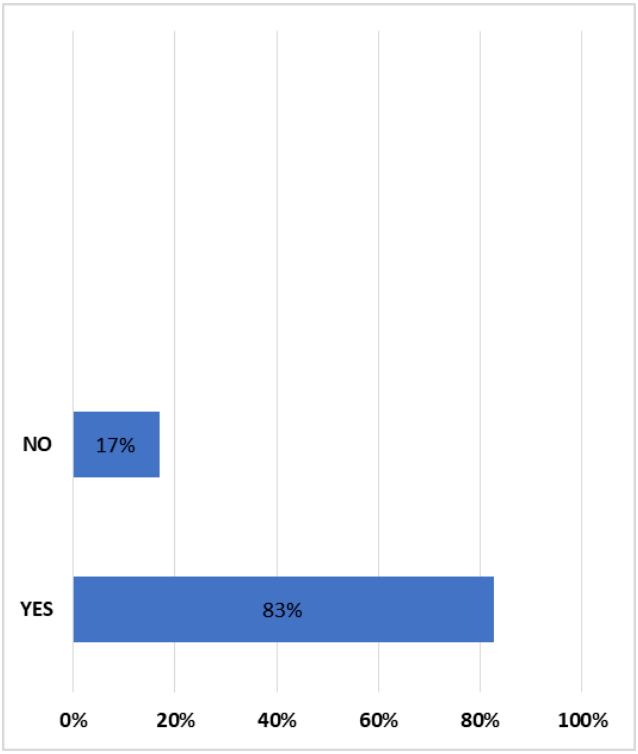

Fig. 7: Result for change in spectacle?

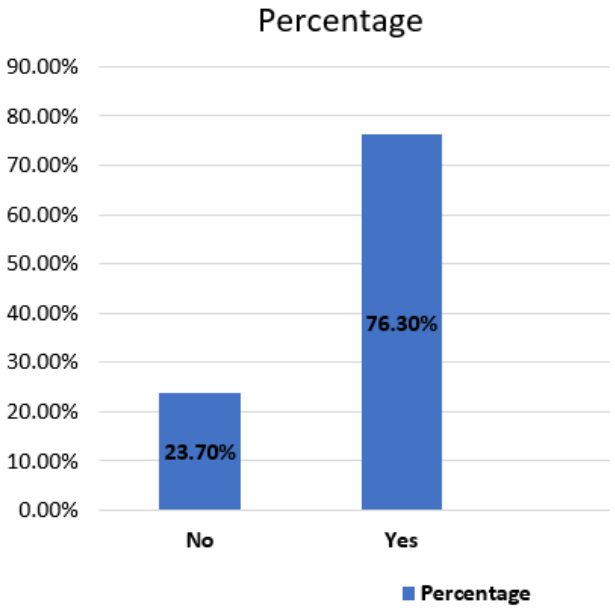

Fig. 8: Results for feeling restless and stressed while prolonged use of digital devices

Table 2: Questionnaire response rate n=156

Variables		N=156	Percentage
Age	<13 years	1	0.6%
	13-30 years	103	60%
	31-40 years	3	1.9%
	41-50 years	4	2.6%
	>50 years	48	30.76%
Gender	Males	56	41%
	Females	99	58.3%
	Others	1	0.7%
Occupation	Student	24	15.4%
	Medical professional	18	11.5%
	Non-medical professional	41	26.3%
	Other	76	48.8%

Table 3:

Variable	N=158	Percentage
The main purpose of digital devices usage		
Education	20	12.8%
Work from home	69	44.2%
Lessiure/ entertainment	23	14.7%
All of the above	44	28.2%

Table 4:

Duration of digital devices usages before the lockdown		
<2 hours	16	10.3%
2-4 hours	32	20.6%
4-6 hours	-	-
6-9 hours	16	10.3%
10- 12 hours	18	11.6%
12- 14 hours	74	47.43%
Others	-	-
Duration of digital devices usages during the lockdown		
<2 hours	**-**	**-**
2-4 hours	**-**	**-**
4-6 hours	55	35.25%
6-9 hours	14	9%
10- 12 hours	49	31.6%
12- 14 hours	21	31.5%
Others	17	11%

Table 5:

Variables	N=156	Percentage
Decrease visual acuity	16	10.3%
Burning of eyes	59	38.1%
Color halos	07	4.5%
Difficulties in focusing the printing test	16	10.3%
Diplopia	0	3.8%
Dryness	42	27.1%
Excessive blink	9	5.8%
Ocular pain	33	21.3%
The feeling of a foreign body	9	5.8%
The feeling of sight got worsened	11	7.1%
Headache	82	52.9%
Eyelid become heavy	20	12.9%
Increase sensitivity to light	19	12.3%
Itching	35	17.4%
Redness	59	22.6%
Watering	22	38.1%
None of the above	26	14.2%
How often do you experience the symptoms?		
Sometimes while using a digital device	46	29.7%
Always while using a digital device	34	21.9%
Never	-	-
Rare	-	-
Sometimes or rarely while using a digital device	49	31.6
What is the severity of the symptoms?		
Relieved spontaneously after sometimes of digital devices usage	64	41%
Relieved only on sleep	60	38.5%
No experience	32	20.5%
Has the frequency or intensity with which you experience these symptoms increased since the lockdown was started?		
Yes	117	75%
No	39	25%

Table 6:

Variables	N= 156	Percentage
Are you using spectacles?		
Yes	79	50.6%
No	77	49.4%
Is your spectacle's power increased during the pandemic?		
Yes	129	82.7%
No	27	17.3%
Are you feeling stressed or restless due to prolonged use of digital devices?		
Yes	119	76.3%
No	37	23.7%
Are you feeling irritated due to the loss of internet connectivity?		
Yes	111	71.2%
No	45	28.8%

4. Discussion

This study shows that most of the participants say that the reason for using digital devices is to work from home and says that they have and says that their spectacle power has been increased due to this by 82.7%. Most of the participants were females with 58%. A study done by Pratyusha Ganne concluded that the prevalence of eye strain was higher among students taking online classes compared to the general public (50.6% vs 33.2%).[9] Our study found that 44.2% majority of participants had exposure to digital devices due to work from home, i.e. online digital exposure. The results of these studies discussed above show similarities with our current study which shows that many participants have to come in contact with digital devices due to online mode. In our study, 35.25% of the participants are found to have more digital exposure during the lockdown. Another study which was done by Balsam Alabdulkader also noted that 78% of participants reported more digital exposure during lockdown.[3]

5. Conclusion

It was discovered that before the lockdown the duration of digital device usage is not there between 4 to 6 hrs but during the lockdown, due to working from home it has increased and headache as an asymptomatic symptom is noticed more during prolonged use of digital devices in lockdown.

6. Source of Funding

None.

7. Conflict of Interest

None.

References

1. Akkaya S, Atakan T, Acikalin B, Aksoy S, Ozkurt Y. Effects of long-term computer use on eye dryness. *North Clin Istanb*. 2018;5(4):319–22.
2. Rosenfield M. Computer Vision syndrome aka. A review of ocular causes & potential treatment. *Ophthalmic Physiol Opt*. 2011;31(5):502–15.
3. Alabdulkader B. Effect of digital device use during COVID-19 on digital eye strain. *Clin Exp Optom*. 2021;104(6):698–704.
4. Asthenopia, American association of ophthalmology (AAO), (online); Eyewiki. Available from: https://www.aao.org/eye-health/.
5. Bahkir FA, Grandee SS. Impact of the COVID-19 lockdown on digital device-related ocular health. *Indian J Ophthalmol*. 2020;68(11):2378–83.
6. Patil A, Bhavya, Chaudhury S, Srivastava S. Eyeing computer vision syndrome: Awareness, knowledge, and its impact on sleep quality among medical students. *Ind Psychiatry J*. 2019;28(1):68–74.
7. Rosenfield M. Computer vision syndrome (a.k.a. digital eye strain). *Optom Pract*. 2016;17(1):1–10.
8. Yogesh S, Abha S, Priyanka S. Mobile usage and sleep patterns among medical students. *Indian J Physiol Pharmacol*. 2014;58(1):100–3.
9. Ganne P, Najeeb S, Chaitanya G, Sharma A, Krishnappa N. Digital Eye Strain Epidemic amid COVID-19 Pandemic - A Cross-sectional Survey. *Ophthalmic Epidemiol*. 2020;28(4):285–92.

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