Covid 19 and Ophthalmic Morbidity among College Students Attending Online Teaching

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Abstract

Due to ongoing pandemic, majority of the academic teaching is executed on online platforms, leading to extended screen time. Anecdotal evidence suggests long-term ophthalmic impact of extended screen time. Present study was carried out to document eye related problems amongst adult university/college students undertaking online classes to document the effects of online teaching. An online survey method was undertaken in the month of July, 2020 amongst university/ college students of Gujarat using google form. All possible social media platforms were used to collect the data from students of Gujarat. Epi Info and SPSS were used and both descriptive and inferential analysis was performed. A total of 620 students from the various streams participated in the study where around 56.5% were female respondents. The majority of students (88% of participants) had noticed eye problems out of that 39.1% of participants felt that online teaching as a reason. Headache (54.0%) was the most common problem experienced by the participants followed by Pain in eyes (34%) and Watering (26.3%). To conclude online teaching has led to increased eye strain and other eye-related problems in university/college going students and risk factors for severity included sessions attended per day, the distance at device kept, and the enjoyment level. In spite of the high incidence of ophthalmic issues, none of the respondents contacted any ophthalmologist for the same.

Keywords: *university/college students, online learning, COVID-19*

Introduction

Coronavirus disease (COVID-19) emerged in December 2019 in china and became pandemic situation worldwide. COVID-19 pandemic has affected more than 215 countries across the globe and many of these countries faced a complete lockdown. Among all the sectors academic sector was among the first few sectors that faced rapid and complete shutdown of all its activities.[1] Due to this complete lockdown universities have been closed and exams were postpones which creates a huge pressure on higher education institutions and students[2]. According to UNESCO, over 320 million students in Indian schools and colleges are currently impacted.[3] Hence the academic teaching is executed on online platforms[4,5,6].

Besides this collegians and youngsters are known to have a long duration of screen view be it use computers, tablets, mobile phones, or gaming consoles. The lockdown has further compounded the problem with the virtual classes, making it increasingly difficult to reduce the screen time of young eyes. Digital eye strain (DES), also known as computer vision syndrome, involves a range of ocular and visual symptoms and prevalence of it is 50% or more among the computer users.[7,8,9] There are evidences that usual longer screen time are related to ocular symptoms reported like eye strain,

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irritation, burning sensation, redness, blurred vision and double vision due to rapid change in accommodative mechanism.[10,11,12] These symptoms commonly managed by non-pharmacologically management includes correct ergonomic practices, the use of appropriate lighting while using devices, careful positioning of the digital device, screen distance and taking breaks.[8,13.14]

Besides online teaching a current situation of lock down and various restrictions has also led to a rapid change in the routine lifestyle of individuals and there is more dependency on TV, mobile and laptop to watch movies/series, attend webinars and video calls. Present study is focused on college / university going students to evaluate the ophthalmic impact of online teaching. The two main objectives of the study are to document the various effects of online teaching and to identify the associated risk factors.

Methods

An online survey was conducted in the month of July,2020 amongst university/ college going students of Gujarat to document the effects of online teaching. For the data collection google form was created and sent to all students of various academic colleges of Gujarat. All possible social media platforms like WhatsApp, Facebook and emails were used to reach out the maximum number of students[15]. Snow ball sampling method was used to get the more participants.

Any university/college going student (irrespective of stream) and wishes to be a part of a survey irrespective of gender and grades/semester can participate. Those who were not willing to participate and not filled the form were excluded from the study and those who filled the forms were considered to have an implied consent to the study.

Data was entered and cross-checked using Excel spread sheet. Data analysis was performed using statistical software like Epi Info version 6.01 and SPSS 20.0. Both descriptive and inferential analysis was carried out to get the better understanding. Inferential analysis was carried out at 95% CI level.

Results

A total of 620 individuals had participated in the study. Out of these total 620 participants maximum participants (69.6%) were from medical stream. Out of 620 participants,56.5% participants were female and majority of them (90%) were belongs to age group 25 years and younger than that. At the time of survey 56.1% participants had glasses. The mean age of the participating students was 21.5 years with a SD of ± 2.9 years. [Table 1.]

About 73% of the total participants attended at least one online teaching session per day and very few participants (5.8%) had attended more than 3 session per day. Each of the online session was around 45-60 minutes. It was documented that only 15.5% participants were enjoying the online teaching over the actual learning while others either did not find any difference between both formats or were not enjoying online session. Majority of the participants (67.3%) used mobile for the online lectures. Almost one fourth of the total participants were not able to attend online classes for more than 30 minutes continuously and felt like leaving in between due to various reasons most common being distraction or pain in eye/watering. On inquiring about distance, they maintain between eyes and device around 46.6 % were not adhering to any distance, whereas around 34% used the device to less than 40 cms. [Table 2.] Apart from online education almost 60% had to undertake 1-3 hrs of additional studying per day. Overall 8.7% of the participants felt they had improved learning by Online teaching.

Table 3. Suggests that more than three fourth of the total participants felt that online learning is more strainful to their eyes. Almost 88% participants had noticed any problem related to eyes.

Out of those who included in the present study around 88 % complained eye issues. Out of those 88% (n=545) who had noticed any ophthalmic challenges, 39.1% participants felt that mentioned problems started after beginning of online teaching, however, very few participants (14.1%) had visited eye specialist for the problem experienced. Headache (54.0%) was the most common problem experienced by the participants followed by Pain in eyes (34%), Excessive rubbing of eyes (29.5%), Watering (26.3%) and redness in eyes (15.5%). [Table 4.]

Results revealed that the problems like excessive rubbing of eyes, pain in eyes, redness, headache and

watering were noticed less in the participants who were enjoyed the online classes compared to others. It has been also found that this difference is statistically significant for the excessive rubbing of eyes (p =0.006), headache (p =0.007) and watering (p =0.024).

Above mentioned problems (except redness and watering) were noticed more in the participants who look at the screen at < 40 cms distance followed by > 40 cms distance and variable distance. This difference is statistically significant for the excessive rubbing of eyes (p =0.007) and pain in eyes (p =0.002). Those who attended 1 or less than 1 session of online teaching or webinar per day had experienced less problems compared to those who attended >1 to 3 sessions or > 3 sessions per day. Those who attended more 3 sessions per day experienced more problems related to eyes. Found difference is statistically significant for the pain in eyes (p =0.000), redness (p =0.036) and headache (p =0.033).[Table 5.]

Table 1. Distribution of study participants as per selected socio demographic profile and stream of education

Variables	Course Type					Total (N=620)
	Engineer (N=72)	Medical (N=432)	Paramedical (N=16)	Public Health (N=39)	Other (N=61)	
Gender						
Female	14 (19.4)	259 (60)	16 (100)	25 (64.1)	36 (59)	350 (56.5)
Male	58 (80.6)	173 (40)	0 (0)	14 (35.9)	25 (41)	270 (43.5)
Age						
<= 20 years	49 (68.1)	187 (43.3)	7 (43.8)	0 (0)	20 (32.8)	263 (42.4)
21-25 years	23 (31.9)	208 (48.1)	9 (56.2)	26 (66.7)	39 (63.9)	305 (49.2)
26-30 years	0 (0)	32 (7.4)	0 (0)	9 (23.1)	2 (3.3)	43(6.9)
> 30 years	0 (0)	5 (1.2)	0 (0)	4 (10.3)	0 (0)	9(1.5)
Glasses	27 (37.5)	258 (59.7)	9 (56.2)	23 (59.0)	31 (50.8)	348 (56.1)

Table 2. Distribution of study population as per participation in online Education

Variables	Course Type					Total (N=620)
	Engineer (N=72)	Medical (N=432)	Paramedical (N=16)	Public Health (N=39)	Other (N=61)	
No. of webinar or teaching session in a week						
0-1 sessions per day	34 (47.2)	324 (75.0)	14 (87.5)	33 (84.6)	49 (80.3)	454(73.2)
>1- 3 sessions per day	28(38.9)	85 (19.7)	2 (12.5)	6 (15.4)	9 (14.8)	130 (21.0)
>3 sessions per day	10 (13.9)	23 (5.3)	0 (0)	0 (0)	3 (4.9)	36 (5.8)
Do you enjoy online learning over actual learning						
Very much	6 (8.3)	72 (16.7)	5 (31.2)	7 (17.9)	6 (9.8)	96 (15.5)
Device used for online lectures						
Mobile	45 (62.5)	313 (72.5)	15 (93.8)	18(46.2)	26 (42.6)	417 (67.3)
Laptop	23 (31.9)	67(15.5)	1 (6.2)	20 (51.3)	33 (54.1)	144 (23.2)
Tablet	2 (2.8)	52(12.0)	0 (0)	0 (0)	0 (0)	54 (8.7)
Either using both or none	2 (2.8)	0 (0)	0 (0)	1 (2.6)	2 (3.2)	5 (0.8)
Upto what duration you can continuously attend online class						
>2 hours	9 (12.5)	53 (12.3)	2 (12.5)	2 (5.1)	11(18.0)	77 (12.4)
Upto 2 hour	24 (33.3)	94 (21.8)	0 (0)	9 (23.1)	12 (19.7)	139 (22.4)
Upto 1 hour	23 (31.9)	188 (43.5)	5 (31.2)	16 (41.0)	25 (41.0)	257 (41.5)
Upto 30 minutes	16 (22.2)	97 (22.5)	9 (56.2)	12 (30.8)	13 (21.3)	147 (23.7)
At what distance you look at the screen						
<40 cms	22 (30.6)	155 (35.9)	3 (18.8)	11 (28.2)	19 (31.1)	210 (33.9)
>40cms	15 (20.8)	84 (19.4)	0 (0)	8 (20.5)	14 (23.0)	121 (19.5)
Variable	35 (38.6)	193 (44.7)	13 (81.2)	20 (51.3)	28 (45.9)	289 (46.6)

Table 3. Effect of online teaching

Variables	Course Type					Total (N=620)
	Engineer (N=72)	Medical (N=432)	Paramedical (N=16)	Public Health (N=39)	Other (N=61)	
Do you feel online learning is more strainful to your eyes	47 (65.3)	327 (75.7)	10 (62.5)	32 (82.1)	57 (93.4)	473 (76.3)
Have you noticed any eye problem	66 (91.7)	375 (86.8)	14 (87.5)	34 (87.2)	56 (91.8)	545 (87.9)

Table 4. Descriptive analysis of those who noticed any eye problem (N=545)

Variables	Course Type					Total (N=545)
	Engineer (N=66)	Medical (N=375)	Paramedical (N=14)	Public Health (N=34)	Other (N=56)	
Feel that above mentioned problems started after beginning of online study	24 (36.4)	141 (37.6)	5 (35.7)	12 (35.3)	31 (55.4)	213 (39.1)
Visited eye specialist for these	11 (16.7)	46 (12.3)	0 (0)	7 (20.6)	13 (23.2)	77 (14.1)
Use any eye drop for this	12 (18.2)	65 (17.3)	1 (7.1)	9 (26.5)	21 (37.5)	108 (19.8)

Table 5. Inferential association with Ophthalmic involvement and other variables and its association with other variables

Variable	Problems experienced			P-value
	Yes	No	Total	

Cont... **Table 5. Inferential association with Ophthalmic involvement and other variables and its association with other variables**

Excessive Rubbing of eyes					
Enjoying online classes	Very Much	17 (17.7)	79 (82.3)	96	0.006
	No difference or not much	166 (31.7)	358 (68.3)	524	
At what distance you look at the screen	<40 cms	76 (36.2)	134 (63.8)	210	0.007
	>40 cms	39 (32.2)	82 (67.8)	121	
	Variable	68 (23.5)	221 (76.5)	289	
Pain in eyes					
At what distance you look at the screen	<40 cms	89 (42.4)	121 (57.6)	210	0.002
	>40 cms	43 (35.5)	78 (64.5)	121	
	Variable	79 (27.3)	210 (72.7)	289	
No.of webinars attended	0-1 sessions per day	134 (29.5)	320 (70.5)	454	0.000
	>1- 3 sessions per day	60 (46.2)	70 (53.8)	130	
	>3 sessions per day	17 (47.2)	19 (52.8)	36	
Redness					
No.of webinars attended	0-1 sessions per day	66 (14.5)	388 (85.5)	454	0.036
	>1- 3 sessions per day	19 (14.6)	111 (85.4)	130	
	>3 sessions per day	11 (30.6)	25 (69.4)	36	

Cont... **Table 5. Inferential association with Ophthalmic involvement and other variables and its association with other variables**

Headache					
Enjoying online classes	Very Much	40 (41.7)	56 (58.3)	96	0.007
	No difference or not much	296 (56.5)	228 (43.5)	524	
No.of webinars attended	0-1 sessions per day	232 (51.1)	222 (48.9)	454	0.033
	>1- 3 sessions per day	80 (61.5)	50 (38.5)	130	
	>3 sessions per day	24 (66.7)	12 (33.3)	36	
Watering					
Enjoying online classes	Very Much	16 (16.7)	80 (83.3)	96	0.024
	No difference or not much	145 (27.7)	379 (72.3)	524	

Discussion

The current study sought to document the effect of online teaching and to identify associated risk factors. Findings of the study signifies that most of the student (88%) experienced eye problem due to online teaching which is similar to prevalence of computer vision syndrome found in engineer and medical students of Chennai.[16] Even there is more free time due to lockdown, students cannot really focus into their study because of this ongoing pandemic effect and their study has affected much more than usual.

Results shows that the only 15.5% students enjoying the online teaching. However, it was found that the almost 74% students liked studying through online teaching in the study conducted by Shatakshi Lall, & Nardev Singh.[17]

Attending classes online without break is strainful to their eyes said to be causing problems like dry eye syndrome, burning sensation in eyes, watering, redness, headache, excessive rubbing of eyes. Out of all these reported symptoms head ache was the most common (50.4%) problem experienced by the students which is quite similar to the study conducted on university students in UAE.[12] This study reveals that those who are attending more than 3 sessions per day experiencing more ophthalmic problems. Joowon Kim et al. also found that longer daily smartphone use was associated with a higher likelihood of experiencing or having ocular symptoms.[18] Advantages of online and Digital education were highlighted by Allen [19] and Saxena [20].

Conclusion

Online teaching has affected the young population which has reported a trend of ophthalmic complaints. Online teaching has increased eye strain and other eye related problems in university/college going students and affected their study. Eye related problems experienced by the students during the process of online teaching are associated with the variables like no. of sessions attended

per day, distance at device kept and the enjoyment level. excessive rubbing of eyes is associated with level of enjoyment and at what distance device is kept, pain in eyes is associated with at what distance device is kept and no. of sessions attended, redness is associated with no. of sessions attended, headache is associated with level of enjoyment and no. of sessions attended while watering is associated with enjoyment level.

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