

# Digital Education and its Effect on Ocular Morbidity in Covid 19 Lockdown

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## Abstract

**Background:** The Covid 19 pandemic forced the adolescent group to increase screen time (i.e long hours of digital usage), it became their daily routine to spend time in front of computer or any digital devices. Thus, the COVID-19 pandemic was followed by another pandemic of ocular problems. **Aim:** To study the ocular morbidity due to digital education with respect to duration of use and severity of symptoms in adolescent age group. **Material and Methods:** It was a prospective observational study in which online survey in the form of questionnaire was done. Participants from adolescent age group of 10 to 16 were included. After the approval from the Ethics Committee, an open online survey through Google forms was sent to the parents of the adolescent children as all of the participants were below 18 years of age. Informed consent from the parents was taken. The participants filled the form under the guidance of their parents. **Results:** Out of total 50 participants, 56% (28/50) which was nearly half of the participants were in the age group of 13-16 years. Most common symptoms was headache in 46% (23/50) followed by watering of eyes in 44% (22/50), burning in 40% (20/50), eye pain and heaviness in 38% (19/50). **Conclusion:** In Covid 19 pandemic, the students were exposed to prolong digital usage which has inadvertently affected their ocular health. Hence awareness amongst the parents and children is very essential.

**Key words:** Digital Education, Covid 19, Pandemic

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## Introduction

The world is experiencing the COVID-19 pandemic which has been very devastating. It has taken many lives commencing as acute respiratory distress syndrome (ARDS) and further resulting in multi organ failure. As a result of which, the government has been imposing lockdown and quarantine measures for the safety of the people. Hence, work from home was started for adults and online teaching for students.

As the digital screen time for the school going children increased, it became their daily routine to spend time in front of computer or any digital devices. Screen time refers to the time spent by an individual in front of a digital devices for various activities. Thus, the COVID-19 pandemic was followed by another pandemic of ocular problems.<sup>[1]</sup>

The American Optometric Association quotes that as little as two hours usage of digital devices are enough to cause eye related problems referred to as Digital eye strain.<sup>[2]</sup> These

devices emit short high energy waves which penetrate the eye causing photochemical damage to the retinal cells resulting in a sequence of eye problems. It ranges from Digital strain to Computer vision syndrome.<sup>[3]</sup> It not only affects the visual system but also causes musculoskeletal strain<sup>[4-6]</sup> and circadian disturbances<sup>[4,7,8]</sup> and together they contribute to the computer vision syndrome.

This study was conducted to study the ocular morbidity due to digital education with respect to duration of use and severity of symptoms in adolescent age group.

### Material And Methods

It was a prospective observational study conducted in the form of an online survey as a questionnaire. It consisted of 28 questions opened for 2 weeks. Participants from adolescent age group of 10 to 16 years were included in the study.

After the approval from the Ethics Committee, an open online survey through Google forms were sent to the parents of the adolescent children as all of the participants were below 18 years of age.

Informed consent from the parents was taken. The participants filled the form under the guidance of their parents. Incompletely answered google forms were excluded from the study. Multiple responses from the same IP address were also not considered.

### Results

Fifty-five students enrolled in the study but five of them submitted incomplete forms. So only fifty students were considered. 21 (42%) participants were males and 29 (58%) were females. 56% (28/50) were in age group of 13-16 and 44% (22/50) were in 10-12 age group.

Majority of the students i.e. 44% (22/50) used the digital devices for less than 2 hours before lockdown which was increased to 4-6 hours after lockdown in 42% participants (21/50).

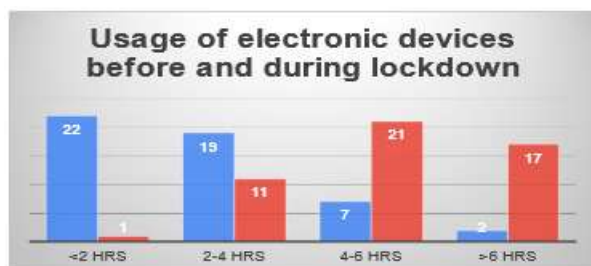


Figure 1: Usage of electronic devices

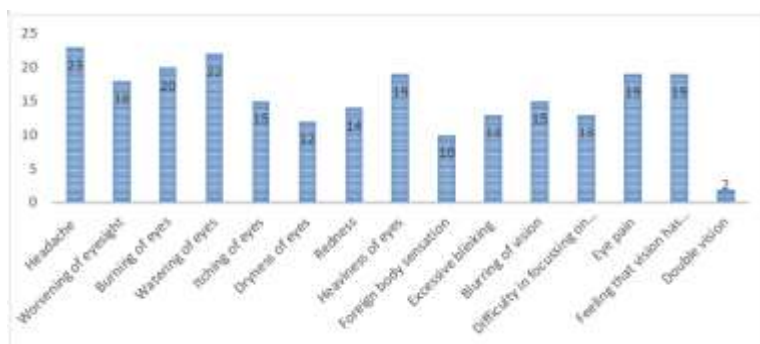
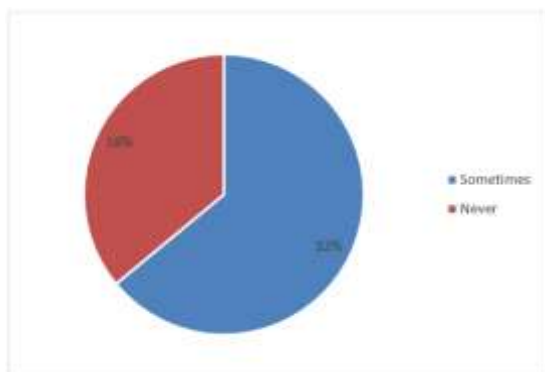


Figure 2: Graph showing frequency of each symptom of experienced by the adolescent group

Graph showing frequency with each symptom affected the adolescent group in which the headache was the most experienced symptom (23/50) followed by watering of eyes, burning of eyes, heaviness and eye pain.

26% (13/50) of the students had a history of spectacle use. 40% (20/50) of them complaint of worsening of eyesight.



**Figure 3: Pie chart depicting frequency of symptoms in all the participants**

32% of the participants reported occurrence of symptoms at some point in the day while 18% said they never had any symptoms of eye strain.

10% of the participants reported spontaneous resolution of symptoms while 16% said that sleep relieved their symptoms. Only 3% participants needed some form of treatment to reduce the symptoms.

### Discussion

The increased use of digital devices has led to increase in screen time by children due to virtual education. It comprises of online classes, online assignments, gaming, shopping, video chatting with family and friends, online entertainment etc.

Our study included more females than males which is similar to previous studies which have also shown female gender preponderance<sup>[9-11]</sup>. Bakhir et al also noted that there was increase in the number of females compared to males but in these studies all the participants were adults. There was an increase in dry eye in females due to autoimmune conditions or make up related issues was also attributed to the female preponderance in this study. An increase of dry eye in males was quoted by Logaraj et al.

Amongst the 50 participants 56% (28/50) which was nearly half of the participants were in the age group of 13-16 years. The average age of participants in Agrawal et al was 12.53 years.

The most common symptom in our study was headache in 46% (23/50) followed by watering of eyes in 44%(22/50) followed by burning in 40% (20/50) both of them could be sign of dry eye due to excessive use of digital devices. This can also be attributed to uncorrected refractive errors, eye strain.

Eye pain was experienced by 38% (19/50) of the children in our study. Headache and eye pain could be due to non relaxation of the accommodating muscles which in turn cause undue strain on the intrinsic muscles. This all is caused by the prolonged use of digital devices. In the study conducted by Dessie et al eye pain was experienced by 47.63 % people as the contact lens wearers were included in the study.

Heaviness in eyes was noted in 38% (19/50) of the children which could be a manifestation of dry eyes.

Sleep pattern was also affected due to prolonged digital use in children which was also reported by many studies.

Thus, these adolescents who were not used to prolonged digital device exposure were compelled to do so during the pandemic as a means of education. This has adversely affected their ocular health.

### **Limitations**

The major limitation of this study is that it is a form-based study and did not include direct examination of students by an ophthalmologist. This could be the reason for under-reporting of the symptoms and signs. This includes changing and uncorrected refractive errors as well as vitamin and other nutritional deficiencies which are the major causes of ocular morbidity in this age group.

Another limitation of this study is the paucity of participants. Thus, further studies with larger sample size are required for validation of results.

### **Prevention and management**

Due to the ongoing the pandemic, the students were forced to have prolonged digital device exposure. This has led to digital eye strain and computer vision syndrome. It can be prevented by taking appropriate measures. Blinking at intervals should be encouraged.

There should be proper positioning of the laptop 4-5 inches below eye level as only inferior part of the globe is exposed to the environment.

A rule of thumb 20-20-20 should be followed which says that after 20 minutes of digital use, a 20 seconds break should be taken to focus on a distant object located 20 feet away.

The “blue light filter glasses” should be used, these are blue light filters which are in built in devices themselves or are glasses with slight yellow tint. By using these glasses the circadian rhythm can be controlled.

Gentle massage over the lid once or twice a day, hot fomentation, a preservative free lubricant can also be used. Podcasts and audio books can also be preferred over online videos.

It has now been proven that the evaporative eye disease is cause of these symptoms which is due to decrease in blink rate because of prolonged exposure of digital devices by the students.

### **Conclusion**

This study concluded that due to Covid 19 pandemic the students were exposed to prolong digital usage which has inadvertently affected their ocular health. Awareness amongst the parents and children is very essential. Adequate measures to prevent the eye strain and to decrease the side effects are required.

### **Bibliography**

1. Agarwal S, Bhartiya S, Mithal K, Shukla P, Dabas G. Increase in ocular problems during COVID-19 pandemic in school going children-a survey based study. *Indian J Ophthalmol*, 2021 Mar; 69(3) 777-778.
2. Computer vision syndrome (CVS) *American Optometric Association [Online]* Available from. Last cited on 2020 Aug 24.
3. Madhan MRR. Computer vision syndrome. *Nurs J India* 2009; 100:236-7.
4. 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; 28:68-74.
5. Loh K, Redd S. Understanding and preventing computer vision syndrome. *Malays Fam Physician*. 2008; 3:128-30.

6. Wapa A, Namgyal A. Computer vision syndrome: Affecting young and old alike. *Delhi Journal of Ophthalmology*. 2018;29:74–5.
7. Chang AM, Aeschbach D, Duffy JF, Czeisler CA. Evening use of light-emitting eReaders negatively affects sleep, circadian timing, and next-morning alertness. *Proc Natl Acad Sci USA*. 2015;112:1232–7.
8. Rosenfield M. Computer Vision syndrome aka. *Digital Eye Strain Optometry in Practice*. 2016;17:1–10.
9. Eyes overexposed: The Digital Device Dilemma. (2016). Retrieved from Vision Impact Institute.
10. Portello JK, Rosenfield M, Bababekova Y, Estrada JM, Leon A. Computer related visual symptoms in office workers. *Ophthalmic Physio Opt* 2012;32:375-82.
11. Sen A, Richardson S. A study of computer related upper limb discomfort and computer vision syndrome. *J Hum Ergol* 2007;36:45-50.
12. Agrawal S, Bhartiya S, Mittal K, Shukla P, Dabas G. Increase in ocular problems during COVID-19 pandemic in school going children- A Survey Based Study. *Indian J Ophthalmol*. 2021 Mar;69(3):777-778.
13. Dessie A, Adane F, Nega A, Wami SD, Chercos DH. Computer vision syndrome and associated factors among computer users in Debre Tabor Town, Northwest Ethiopia. *J Environ Public health* 2018; 2018:4107590.