



P-ISSN: 2664-3685
E-ISSN: 2664-3693
www.paediatricjournal.com
IJPG 2021; 4(2): 26-28
Received: 01-09-2021
Accepted: 30-09-2021

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Digital eyestrain in school going children during covid times

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DOI: <https://doi.org/10.33545/26643685.2021.v4.i2a.165>

Abstract

This 1.5 year follow up assessment was performed on 1000 school going students (grade 1 to grade 10). Out of these 1000 students 100 were taken as control, who voluntarily opted out of the use of E-learning environment of school. In the Assessment over 1.5 years, the visual acuity was monitored. The average value was Dependant on the total exposure time on the electronic gadgets, they were using. However in all the included students, the E-learning environment use time significantly affected the visual Acuity in all the students. The pathological causes of diminision of visual acuity were not included in the study.

Keywords: digital eyestrain, children, computer vision syndrome, covid, online classes, e-learning

Introduction

During the sudden outbreak of covid 19 pandemic, The use of an E-Learning environment has become predominant worldwide.

The closure of classroom studies Effected the E-learning environment & hence the Exposure time to the electronic gadgets became high^[1].

Myopia prevalence is high among children in Southeast Asian countries, whereas it is quiet low in Adolescents in west- Asian, African, Caucasians,& American countries^[2, 3]. The prevalence of myopia & high myopia varies according to region & ethnic group. On the basis of ethnic, Economic, Environmental & other data, the global incidence of Juvenile Myopia & high myopia is expected to significantly increase^[3, 4].

Moreover, some scholars have indicated the myopia prevalence depends on the genetic factors^[5]. However, environmental factors (e.g. Decrease in outdoor activities also influences myopia development^[6, 7].

Among children increase in education pressure and lifestyle changes, have reduced the time spent on outdoor activities- this can later result in myopia development^[8].

Visual Acuity refers to maximum ability to distinguish the shape, size, and fine structures of an object with eyes^[8].

Zheng.et.al concluded that a child's vision can reach the levels of adult vision at the age of 6 years, and thus, the most important period for prevention of myopia is 3-6 years of age.

Myopia refers to visual distortion caused by the focus of the parallel lights from 5 meters afar from the refraction system of the eye falling in front of the retina in the state of adjustment in the static state. $> -6. D$ is defined as High myopia^[9].

Materials and Methods

A total of 1000 students were taken, out of which 620 were males whereas 380 were females' Group 1 included 100 students as control group (age 5-15 years)

While group 2 had 900 students on which effect of E-learning environment was observed (age 5-15 years). Control group had those students who were not attending the virtual classrooms, either they were using their own methods of book reading or taking help of computers/mobile for less than half-hour daily.

First (Baseline) assessment data (Visual acuity) were obtained during regular check-up in the month of jan/feb 2020. The final check-up of all the students was done in the month of August 2021.

The frequency of E-learning environment was approximately 3-4 hours /day with 5 minutes interval after each ½ hour of constant exposure.

In all the included students, the E-Learning Environment use time significantly affected the visual acuity in the students

Group	Students	Visual acuity (normal)	Abnormal
GROUP 1	100	89	11/6p
GROUP 2	900	216(24%)	684 (76%)

Result

In all the included students, the E-Learning Environment use time significantly affected the visual acuity in the students. It has been seen that children and adolescents often use several devices at once, for example to browse social media on their phone while watching contents for studies on other device which in turn further increased the eye strain. Switching between devices increases the strain on the eyes by 22 percent, as this involves switching distances between different devices, forcing the eyes to adjust focussing from one device to another.

Discussion

The E-Learning environment was more popular in during covid era. The relevant research is showing the increase use of computers and mobile can affect the vision^[10, 11, 12].

According to the American Academy of ophthalmology, extensive use of computers can lead to eye fatigue, redness, blurred vision and other symptoms^[13, 14].

Koozies *et al.* found that viewing computer screens regularly can lead to eye discomfort, blurred vision fatigue & headache and other symptoms^[15, 16].

In China, "studies have indicated that the burden of classwork in virtual classroom has some negative impacts on students vision. Yang. *et al.* asserted that homework remains the main factor of decline in vision amongst students."^[17, 18]

In this study, the use time of E-Learning environment is the sum of in class and after class use time of all electronic gadgets, for e.g., Computers, Mobiles, Tablets^[19, 9, 21].

School Closure protects the youth from diseases such as Covid, but this affects their studies. To avoid this, schools around the globe are shifting to online teaching- that is E-learning method. The Digital learning has become a daily necessity during this covid 19 pandemic, which lead to a substantial increase in digital device use among children of school going age.

In our study, the most common device used for online studies was smartphone (61%), then laptops (33%) and then dry Eye Disease were higher in children^[10, 11, 12, 16].

Duration In front of screen of > 2-4 hours /day was found to be of significance as a risk factor for higher DES (Dry Eye Syndrome), along with diminision of visual acuity in our study^[17, 18, 19].

Conclusion

Above study shows that it is really important to be aware of the potential risks to children's short and long-term eye and general health. It is therefore important to see that the devices are used appropriately and that the activities which are not involving the use of electronic devices are followed like playing outdoor games etc. Hence by increasing the awareness of the potential risks associated with increased screentime use, we can share strategies with the school teachers & parents, which reduce the negative effects of digital screen & help in promoting the general health of children & adolescents.

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