



“STUDY OF THE RELATIONSHIP BETWEEN EXPOSURE TO VIDEOGAME OR OTHER DIGITAL SCREENS AND EYE PROBLEMS IN CHILDREN BETWEEN 5 TO 10 YEARS OF AGE”

Ophthalmology

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ABSTRACT

Introduction: Children of 5 to 10 years of age are using their free time for digital entertainment. Video games have existed for nearly 70 years, and their popularity increases every year. Playing video games or using digital screens for extended periods can cause children to experience many asthenopic symptoms as seen in computer vision syndrome in adults. Patients suffering from asthenopia present with headaches, excessively watery eyes, double vision, blurred vision, itching, dry eye, and redness. **Aims:** To study the relationship between the duration of exposure to video games or other digital screens and the severity of eye symptoms in children of 5 to 10 years of age and provide the required treatment and preventive measures as early as possible and help the needful patients. **Materials And Methods:** An observational, cross-sectional study of 300 children between 5 to 10 years of age who attend our eye clinic and who were using video games or other digital screens was employed. Based on the duration of videogames or digital screens usage they were divided into case and control groups. **Result:** When separating the patients according to time spent playing video games or using digital screens, the case group had more asthenopia compared to the control group. The comparison between the low and high electronic usage subgroups within the case group showed a higher prevalence of asthenopia in the high electronic usage subgroup. **Conclusion:** Asthenopia is statistically more frequent in children who play video games or use digital screens for more than 30 minutes per day and every day. The severity and frequency of asthenopia increase with more time spent on digital screens.

KEYWORDS

Videogame, Asthenopic Symptoms, Dry eye, Digital Screens.

INTRODUCTION

Children of 5 to 10 years of age are using their free time for digital entertainment. Video games have existed for nearly 70 years, and their popularity increases every year. Playing video games or using digital screens for extended amounts of time can cause children to experience many of the same symptoms seen in computer vision syndrome in adults. Extensive viewing of the digital screen can lead to eye discomfort, fatigue, blurry vision, and headaches. (Smith, 1997)

Asthenopia is clinically defined as a subjective sensation of visual fatigue, eye weakness, or eyestrain. It results from an imbalance of extraocular muscles, uncorrected refractive errors, accommodative impairment, and improper lighting. (Bali et al., 2007)

Patients suffering from asthenopia present with excessively watery eyes, double vision, blurred vision, itching, headache, dry eye, and redness. (Barar et al., 2007) During the past decade, vision problems that were attributed to the use of digital screens have gradually shifted from being a workplace health issue to a wider public health issue. “Digital eye strain–DES” is a newer term, coined to include all aspects of eyesight issues related to long hours of work in front of a digital screen. (Blehm et al., 2005; Sheppard & Wolffsohn, 2018)

A related classification, “videogame vision syndrome” has been proposed to specifically address vision issues related to large periods of continuous use of screen-enabled devices to play videogames. (Rechichi et al., 2017)

AIMS

The aim of the study To study the relationship between duration of exposure to videogame and other digital screens and the severity of eye symptoms in children of 5 to 10 years of age and provide the required treatment and preventive measures as early as possible and help the needful patients.

MATERIALS AND METHODS

An observational, cross-sectional study of a population of children using video games or other digital screens were employed. All patients between 5 and 10 years of age who attend our eye clinic and who were using video games or other digital screens were recruited. Total three hundred children were recruited. Questionnaire were used to record asthenopic symptoms and daily exposure to videogames or other digital screens. Ophthalmological examination included anterior segment examination by slitlamp, refractive error, ocular motility tests, intra ocular pressure and retinal examination were done. Written and informed consent was obtained from the parents of all participating children in this study.

Inclusion Criteria:

Children between 5 to 10 years of age who attended OPD for a routine eye examination or asthenopic symptoms and who were using video games or other digital screens were included.

Exclusion Criteria:

- Children having eye symptoms due to ocular pathology.
- Children who were not using any digital screen.
- Children having refractive errors and not using glasses.
- Parents are not willing to give consent for the study.

The questionnaire was used to record asthenopic symptoms and daily exposure to video games or other digital screens and their duration.

Control Group :

Children who played video games or use other digital screens for 30 minutes or less per day and not every day.

Case Group :

Children who played video games or use other digital screens for more than 30 minutes per day and every day.

Low Digital Screen Use Group within Cases : Children using video games or other digital screens for 2 hours or less.

High Digital Screen Use Group within cases: Children use video games or other digital screens for more than 2 hours.

RESULT

The sample comprised 300 children who were examined by only one ophthalmologist. The lower age limit of 5 years was chosen because this is the typical age when children start playing video games and using other electronic screens and the upper age limit of 10 years was chosen because the visual system of children is highly dynamic during the critical period and up to this age.

Table 1: Characteristics of the study groups

Group	Boys	Girls	Total
Case	79	71	150
Control	73	77	150

Table 2: Sub-groups amongst cases

Group	Low Digital Screen Use	High Digital Screen Use
Case	77	73

Out of 300 participants, 152 were boys and 148 were girls. (P>0.05) In the case group, 77 children were in the low digital screen use group and

73 children in the high digital screen use group. ($P > 0.05$)

Table 3: Prevalence of Asthenopia in Case and Control Group

Group	Asthenopia present	Asthenopia absent	Total
Case	132	18	150
Control	26	124	150

Out of 150 children in each group, 132 in the case group and 26 in the control group had asthenopic complaints. The high prevalence of asthenopic symptoms among cases as compare to control was statistically significant. ($P < 0.05$)

Table 4: Prevalence of Asthenopic symptoms in Case and Control Group

Symptoms	Control Group (n=26)	Case Group (n=132)
Headache	14	81
Eye Burning	9	31
Eye Strain	5	19
Eye Itching	0	9
Transient Blurring of Vision	4	15
Transient Diplopia	0	7
Eyeache	3	16
Dryness	0	0
Tearing	2	4

Out of the 300 children, 53 % (26 in the control group and 142 in the case group) reported at least one symptom of asthenopia. Headache was the most common asthenopic symptom amongst both groups (81 in the case and 14 in the control group). None of them was suffering from dryness.

Table 5: Prevalence of asthenopia in high and low digital screen use groups (Subgroups within cases)

Group	Asthenopia Present	Asthenopia Absent	Total
High Digital Screen Use	72	1	73
Low Digital Screen Use	60	17	77

In the high digital screen use group, 72 out of 73 had asthenopic symptoms while in the low digital screen use group, 60 out of 77 had asthenopic symptoms. This was statistically significant. ($P < 0.05$)

DISCUSSION

Recently, there has been a sharp increase in the number of children spending long periods using video games or other digital screens. (Hastings et al., 2009) The possibility of using digital screens in the form of laptops, large television screens, or smaller devices such as tablets or pocket-size smartphones has never been as great as it is today and these games have become accessible to almost every child in modern societies.

In Our study when separating the patients according to time spent for playing video games or using a digital screen, 81.33% in the case group had asthenopia as compared to 17.33% in the control group. ($P < 0.05$) The comparison between the high and low digital screen use group amongst the case group showed a higher prevalence of asthenopia in the high digital screen use group. ($P < 0.05$)

A study conducted by Dr.Rechichi in Italian Regional Health Service saw a Significantly high prevalence of Asthenopic symptoms in the Case group(57.87%) than in the Control group when separating the patients according to time spent playing video games. They conclude that asthenopic symptoms and time spent on digital screens had a direct correlation.(Rechichi et al., 2017)

The aim of this study is to draw the attention of pediatric ophthalmologists to the clinical features accompanying frequent video games or other digital screen use in children and subsequently prevent erroneous diagnostic and therapeutic maneuvers, and stimulate further research. Recognizing these symptoms can improve the clinical approach, provide relief for the young patient's visual system, and avoid unnecessary worries for parents.

CONCLUSIONS

Asthenopic symptoms like headache, burning, transient diplopia, eye

ache, etc were statistically more frequent in children who played video games or use digital screens for more than 30 minutes per day and every day. These symptoms were frequent and peculiar in the case group. The possibility of having asthenopic symptoms increases with spending more time on a digital screen. It is important to recognize these signs as possible functional disorders to avoid erroneous diagnostic and therapeutic interventions.

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