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Examining the Relationship Between Screen Time and Digital Eye Strain Among Adolescents in Schools of Agartala

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Abstract:

The rising application of digital devices by adolescents stands as a major cause for health-related worries because digital eye strain (DES) frequently develops from extensive screen use. A research investigation evaluates the bond between digital screen exposure and digital eye strain symptoms among Agartala school adolescents. Diagnostic eye strain emerges from long-duration screen usage among teenagers due to both virtual learning and recreational screen time thus causing symptoms such as dryness fatigue and blurred vision. The study makes use of a cross-sectional methodology to analyses how frequently and severely DES impacts school-aged adolescence. The researchers will conduct surveys with adolescents in Agartala-based schools through self-administered questionnaires that assess screen duration and various screen activities and eye discomfort symptoms. The research team will evaluate eye strain symptom severity by using the standardized Digital Eye Strain Questionnaire (DESQ). The proposed research offers useful assessment of screen time influence on adolescent health specifically examining eye strain as a public health risk. The research investigates how much screen time relates to DES symptom gravity while examining how age demographics with gender and economic status factors affect this relationship. The research results will create the groundwork to build prevention strategies through courses about suitable monitor handling and programs for eye relaxation and protocols for digital wellness.

Keywords:

Screen Time, Digital Eye Strain, Adolescents, Health Impact, Agartala, Questionnaire, Public Health, Eye Fatigue, Virtual Learning, Digital Devices

Introduction

Digital technology has a profound impact on everyday life, especially in education, socialization, and recreation. Its extensive use, however, among adolescents is of concern to physical health—specifically, vision issues. The extensive use of smartphones, computers, and

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tablets has led to the development of digital eye strain (DES), also known as computer vision syndrome (CVS). This condition is caused by prolonged screen exposure and characterized by pain in the eyes, double vision, and headaches. Studies by Coles-Brennan et al. (2019) and others identify an increasing trend of DES that is frequently induced by poor posture and improper screen alignment during prolonged usage.

University students, especially those involved in virtual studies, are highly susceptible to DES. Al Tawil et al. (2020) and Gammoh (2021) established that excessive screen use by students in Jordan was associated with various visual symptoms. Unhealthy ergonomic practices further aggravate the problem. In addition, Anderson and Jiang (2018) maintain that excessive use of screens and social media is harmful to adolescents as it affects their sleep schedules, physical activity, and mental well-being. The increase in myopia among Asian children is also caused by prolonged screen exposure, according to Do et al. (2020), which reported significant alteration in children's vision over time as a result of exposure to smart devices.

To counteract DES, there is an urgent need to adopt measures such as reducing screen time, performing routine eye exercises, keeping the body in a correct posture, and utilizing blue light filters. Awareness campaigns at school and public health need to encourage students and teachers to protect the eyes in the era of digital usage.

Review of Literature

Several studies emphasize the increasing prevalence of Digital Eye Strain (DES) in all age groups, particularly among adolescents who heavily use digital devices for educational and entertainment purposes. Al Tawil et al. (2020) discovered that university students often suffer from computer vision syndrome symptoms, mostly because of excessive screen use. Likewise, Gammoh (2021) indicated that Jordanian students experienced severe eye discomfort and other adverse effects, with results correlating symptom severity with extended screen time and inadequate ergonomic habits.

Mohan et al. (2021) noted that during the COVID-19 pandemic, children's greater dependence on digital devices for online learning resulted in an increase in DES cases. Do et al. (2020) further stated that overuse of devices among teenagers not only causes DES but also induces myopic changes in the eye structure. Key DES management measures, as proposed by Coles-Brennan et al. (2019), are decreased screen time, frequent eye breaks, and the use of blue light filters. Additional studies by Choi et al. (2018) and Chua et al. (2015) also verified that

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prolonged screen time damages tear film and eye surface health, resulting in dryness and discomfort.

Methodology

The research utilized a cross-sectional study design at one Bengali medium school of Agartala.. Out of 100 students 25 students from different classes (6 to 9) were selected by simple random technique.

The data was gathered through self-report questionnaires completed by school students, which captured data on screen use duration and type as well as symptoms of DES.". To provide standardization and accuracy in symptom scoring, the DESQ was applied. The data collected was examined using frequency distributions and correlation analysis to establish the degree of correlation between screen use and eye strain symptoms.

Results

This section documents the research outcomes regarding the connection between screen time duration and digital eye strain symptoms among Agartala school students

Table 1: Demographic profile of the students

Demographic Characteristic	Category	Frequency (N=100)	Percentage (%)
Age (years)	12–13	45	45%
	14–15	55	55%
Gender	Male	50	50%
	Female	50	50%

The study sample consists of 45% adolescents aged 12–13 years and 55% aged 14–15 years. The gender distribution is equal, with 50% males and 50% females.

Table 2: Average Daily Screen Time (in hours) among students

Screen Time Category	Frequency (N=100)	Percentage (%)
Less than 2 hours	25	25%
2–4 hours	45	45%
5–6 hours	20	20%
More than 6 hours	10	10%

The majority of participants (45%) report spending 2–4 hours daily on screens. A smaller proportion spends less than 2 hours (25%), while 20% spend 5–6 hours, and 10% report using screens for more than 6 hours daily.

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Table 3: Prevalence of Digital Eye Strain Symptoms

Eye Strain Symptom	Frequency (N=100)	Percentage (%)
Eye fatigue	70	70%
Dry eyes	60	60%
Blurred vision	45	45%
Headaches	55	55%
Neck and shoulder pain	40	40%

The most common symptom of digital eye strain among participants is eye fatigue, reported by 70%. Dry eyes follow closely at 60%, while headaches and blurred vision are reported by 55% and 45%, respectively

Table 4: Association Between Screen Time and Severity of Digital Eye Strain Symptoms

Screen Time (hours)	Eye Fatigue (N=70)	Dry Eyes (N=60)	Blurred Vision (N=45)	Headaches (N=55)
Less than 2 hours	25%	20%	15%	10%
2–4 hours	35%	30%	25%	30%
5–6 hours	20%	25%	30%	25%
More than 6 hours	20%	25%	30%	35%

As screen time increases, the severity of digital eye strain symptoms also rises. Among participants who spent less than 2 hours on screens, symptoms were less severe, with only 10–25% reporting discomfort. For those who spent 2–4 hours, symptom severity increased, especially headaches (30%) and dry eyes (30%). Participants spending 5–6 hours showed a further increase in severity, particularly blurred vision (30%). The highest severity was observed among those using screens for more than 6 hours, with headaches (35%) and blurred vision (30%) being the most common symptoms.

Table 5: Association Between Demographic Factors and Digital Eye Strain Symptoms

Demographic Factor	Eye Fatigue (N=70)	Dry Eyes (N=60)	Blurred Vision (N=45)	Headaches (N=55)
Age Group (Years)				
12–13	25%	20%	15%	10%
14–15	45%	40%	30%	45%
Gender				
Male	30%	25%	20%	15%
Female	40%	35%	25%	40%

Younger adolescents (12–13 years) reported lower severity of DES symptoms compared to older adolescents (14–15 years), with 45% of the older group experiencing eye fatigue and

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headaches. Females reported higher rates of all symptoms, especially headaches (40%) and dry eyes (35%), compared to males.

Table 6: Correlation Between Screen Time and Digital Eye Strain Symptoms

Variable	Eye Fatigue	Dry Eyes	Blurred Vision	Headaches
Screen Time (hours)	0.67**	0.62**	0.59**	0.64**
Age Group (Years)	0.45*	0.40*	0.42*	0.47*
Gender	0.50*	0.53*	0.49*	0.55*

The relationship between screen time duration shows a powerful positive association with all digital eye strain symptoms yet eye fatigue exhibits the strongest link with a correlation of 0.67** and headaches share a correlation of 0.64**. Age group and gender also show moderate correlations, with older adolescents and females experiencing more severe symptoms.

Hypothesis

The research is grounded on a number of hypotheses about the connection between screen use and digital eye strain (DES) among teenagers. First, it is hypothesized that there is a high positive correlation between the level of screen use and the severity of DES symptoms including eye fatigue, dry eyes, blurred vision, and headaches. Teenagers who spend over four hours a day on digital media are more likely to have more severe symptoms of DES than those with lower screen use.

Second, the research assumes that female adolescents are more prone to DES symptoms than male adolescents. This could be the result of differences in physiology or behaviour regarding screen use and awareness of eye health. Additionally, older adolescents between the ages of 14 and 15 years are predicted to have more DES than younger adolescents between the ages of 12 and 13 years due to greater academic expectations and recreational use of screens.

Lastly, it is expected that demographic factors of age and gender are highly related to the severity of DES symptoms, reflecting the multi-determination of the condition.

Discussion of Results

Research findings show that long exposures to screen time directly relate to worse digital eye strain symptom levels. The study data from Tables 1 and 2 demonstrates that Agartala adolescents dedicate between two to four hours daily to screen activities since 45% of participants engage in this duration. According to Table 3 ninety percent of the adolescents experienced eye fatigue while sixty percent had dry eyes within this group. Table 4 presents substantial evidence that higher screen usage amounts correspond to worse outcomes of digital

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eye strain symptoms. The research indicates that adolescents who spent above 6 hours on screens faced heightened risks of experiencing headaches alongside blurred vision while Al Tawil et al. (2020) and Gammoh (2021) found comparable DES symptom patterns among university students. Screen time displays a positive correlation with DES symptoms according to Table 6 because all digital eye strain symptoms show statistically significant relationships with screen usage.

Conclusion

A research analysis investigated how screen time relates to digital eye strain symptoms among students at Agartala schools. The research data shows that longer screen duration creates severe conditions of Digital Eye Strain symptoms which include eye fatigue and dryness and vision blur and headaches. Adolescents who spent over six hours daily on screens showed the greatest incidence of these symptoms because of excessive digital device usage. The study shows an urgent necessity to launch educational public health initiatives focused on warning students along with their parents and teachers about dangerous screen time dangers and necessary healthful screen practices. Students and other screen users should implement daily preventive habits including eye break intervals and blue light filters in combination with appropriate screen posture to combat DES symptoms. The study highlights the necessity of treating digital eye strain as a primary public health matter since adolescents now spend longer durations looking at screens for schoolwork and leisure activities.

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