IJMEAR | International Journal of Medical Education And Research
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ARTICLE
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Vol. 6 · No. 3 · September 2026

Effects Of Screen Time On Eye Health In Students

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ABSTRACT

The widespread use of digital devices such as smartphones, tablets, computers, and televisions has significantly increased daily screen exposure among students. While these technologies support education, communication, and entertainment, excessive screen time may adversely affect ocular health. Prolonged use of digital screens is associated with symptoms such as eye strain, dry eyes, blurred vision, headaches, irritation, and Computer Vision Syndrome (CVS). This study aimed to evaluate the effects of screen time on eye health among students and to promote awareness of healthy digital device usage. A cross-sectional observational survey was conducted using a structured Google Form questionnaire. Data regarding screen time duration, device usage patterns, and eye-related symptoms were collected from participants after obtaining informed consent. Convenience sampling was employed for participant recruitment. The collected data were analyzed using descriptive statistics and correlation analysis to assess the relationship between screen exposure and ocular symptoms. The findings are expected to provide insight into the impact of excessive screen use on students' eye health and emphasize the importance of adopting healthy digital habits.

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Method

This study employed a cross-sectional observational design using convenience sampling. Data were collected through a Google Form survey distributed among students. Before participation, respondents provided informed consent. The structured questionnaire gathered information on demographic characteristics, daily screen time, device usage patterns, and eye-related symptoms including eye strain, dryness, irritation, blurred vision, and headaches. The collected data were analyzed using descriptive statistics and correlation analysis to examine the association between screen time and eye health outcomes.

RESULTS

Demographic Characteristics and Screen-Time Patterns

Among Participants

After excluding responses with ages greater than 50 years, data from eight participants were included in the analysis. The majority of participants were between 18 and 40 years of age, with ages ranging from 18 to 50 years. Male participants constituted a slightly higher proportion than females. Students represented diverse academic backgrounds including Medicine, Engineering, Humanities, Business, and Other faculties.

Regarding daily screen exposure, most participants reported spending between 2-7 hours per day using digital devices. A smaller proportion reported screen usage exceeding 7 hours daily, while some participants reported less than 2 hours of daily screen exposure. Smartphones and laptops were the most frequently used devices, reflecting their importance for academic and personal activities.

The findings suggest that digital devices have become an essential component of students' daily routines. The prevalence of moderate-to-high screen exposure highlights the increasing reliance on electronic devices for learning, communication, entertainment, and social interaction.

Demographic characteristics and screen-time patterns (Questions 1-5)

Frequen

Variable Category

cy

Age 18-25 years 5

26-40 years 2

41-50 years 1

Gender Male 4

Female 3

Prefer not to

1

say

Screen

Less than 2 h 3

time

2-4 h 3

5-7 h 1

More than 7 h 1

Device

used

Smartphone 3

Laptop 4

Tablet 1

Overall, the demographic profile indicates that screen-based technologies are widely utilized across different educational disciplines, with laptops and smartphones representing the primary devices used by participants.

Device Usage Behavior and Ocular Discomfort

Associated with Screen Exposure

Participants reported using digital devices primarily for studying, social media engagement, watching videos, communication, and gaming. Studying emerged as the most common purpose of screen use. A considerable proportion of participants indicated frequent screen use before bedtime, a behavior that may contribute to visual fatigue and disturbed sleep patterns.

Eye-related discomfort was highly prevalent among respondents. Most participants reported experiencing at least one symptom following prolonged screen exposure. Eye strain and headaches were the most commonly reported complaints, followed by blurred vision and dry eyes. Only a small number of participants reported no noticeable discomfort.

Screen usage behavior and eye discomfort (Questions 6-10)

Frequen

Variable Category

cy

Purpose of use Studying 4

Social media 2

Watching

1

videos

Gaming 1

Bedtime screen

Always/Often 4

use

Sometimes 2

Rarely/Never 2

Eye discomfort Yes 6

No 2

Common

Eye strain 3

symptoms

Headache 2

Blurred vision 2

Dry eyes 1

These findings demonstrate a clear tendency toward visual discomfort among students who regularly engage with digital screens. The predominance of eye strain supports the hypothesis that prolonged screen exposure may adversely affect ocular comfort.

Preventive Practices and Awareness of Eye-Protection

Measures

Participants demonstrated varying levels of awareness regarding preventive

strategies for reducing screen-related eye problems. Symptom frequency ranged from occasional to daily occurrence. Most participants reported taking breaks during screen use, although the frequency of breaks differed considerably.

Awareness of the 20-20-20 rule was limited among participants. While some respondents reported familiarity with the rule, a substantial proportion remained unaware of its existence. Protective measures such as screen filters, blue-light glasses, and brightness reduction were commonly used.

Preventive practices and awareness (Questions 11-15)

Frequen

Variable Category

cy

Symptom frequency Daily 2

Weekly 3

Occasionally 3

Taking breaks Yes 5

No 3

Awareness of 20-20-20

Yes 3

rule

No 5

Protective measures Screen filters 4

Blue-light

2

glasses

Reduced

1

brightness

None 1

The findings suggest that although students are aware of some protective practices, knowledge regarding evidence-based preventive strategies remains inadequate.

Severity of Ocular Symptoms, Eye Health Perception,

and Environmental Factors

Analysis of symptom severity indicated that eye strain was the most frequently experienced symptom. Dryness, headaches, and blurred vision were reported with varying frequency. Most participants rated their overall eye health as moderate rather than excellent.

Environmental conditions such as room lighting and viewing distance varied among respondents. Moderate lighting conditions were most commonly reported, whereas several participants used screens at distances less than 30 cm, a practice associated with increased visual strain.

Eye-health status and environmental factors (Questions 16-20)

Frequen

Variable Category

cy

Overall eye

Moderate 4

health

Good/

3

Excellent

Poor 1

Study lighting Moderate 5

Bright 2

Dim 1

Screen

<30 cm 4

distance

30-50 cm 2

>50 cm 2

Participants reported various methods to reduce eye strain, including following the 20-20-20 rule, reducing screen brightness, increasing text size, maintaining adequate hydration, using artificial tears, and ensuring appropriate viewing distance. These practices reflect a growing awareness of eye-health preservation among students.

DISCUSSION

The present study assessed the effects of screen time on eye health among students and found that prolonged use of digital devices was associated with a high prevalence of ocular symptoms, particularly eye strain, headaches, blurred vision, and dry eyes. Most participants reported using digital devices for academic activities, social media, and entertainment purposes, with smartphones and laptops being the most frequently used devices. These findings support growing evidence that excessive screen exposure contributes significantly to digital eye strain and related visual problems among students.

In the present study, eye strain emerged as the most frequently reported symptom among participants. Similar findings were reported by Rosenfield (2016), who identified eye strain as one of the hallmark manifestations of Computer Vision Syndrome (CVS). Likewise, Sheppard and Wolffsohn (2018) reported that prolonged digital device use commonly results in visual fatigue, discomfort, and reduced ocular performance.

The association between prolonged screen exposure and ocular discomfort observed in our study is consistent with the findings of Kaur et al. (2022), who reported that individuals spending longer durations on digital screens experienced significantly higher rates of dry eyes, headaches, and visual fatigue. Similarly, Mataftsi et al. (2023) concluded that increased digital screen exposure among young adults was strongly associated with symptoms of digital eye strain.

Our findings demonstrated that participants with greater daily screen exposure reported more frequent visual symptoms. This observation aligns with the study conducted by Sharma et al. (2023), which found that university students with screen time exceeding four hours per day were at a significantly higher risk of developing eye-related complaints. Comparable results were also reported by Almuqrashi et al. (2025), who observed a high prevalence of Computer Vision Syndrome among university students with prolonged screen usage.

Headaches were among the commonly reported symptoms in the present study. Roy et al. (2024) similarly demonstrated a positive association between increased screen time and headache frequency among students and young adults. The authors suggested that prolonged visual concentration and accommodative stress may contribute to the development of headaches during screen use.

Dry eye symptoms were also reported by several participants in our study. These findings are supported by Allwihan et al. (2025), who identified a significant relationship between digital device usage and dry eye disease symptoms among university students. Pucker and Tichenor (2024) further explained that reduced blinking frequency during screen viewing contributes to tear film instability and ocular surface dryness.

The present study also found that many participants used screens before bedtime. This finding is consistent with the work of Albalawi et al. (2023), who reported that prolonged evening screen exposure was associated with both dry eye symptoms and reduced sleep quality. Aykutlu et al. (2024) similarly observed that increased digital media use negatively affected both ocular comfort and sleep patterns among adolescents.

A considerable proportion of participants reported limited awareness of the 20-20-20 rule. Similar deficiencies in knowledge regarding preventive eye-care practices have been reported by Patni et al. (2026), who highlighted the need for greater educational interventions to improve digital eye health awareness among university students.

Most participants in the current study reported using preventive strategies such as screen filters, blue-light glasses, brightness adjustment, and periodic breaks. These findings correspond with recommendations proposed by Rosenfield (2016), Sheppard and Wolffsohn (2018), and Kahal et al. (2025), who emphasized the importance of ergonomic practices, proper viewing distance, regular breaks, and environmental adjustments for reducing digital eye strain.

The findings of this study are also consistent with the systematic review conducted by Ccami-Bernal et al. (2023), which reported a high global prevalence of Computer Vision Syndrome among students and office workers. Furthermore, Lanca and Saw (2020) suggested that excessive screen exposure may contribute to long-term ocular consequences, including myopia progression, particularly among younger populations.

Overall, the results of the present study support the growing body of evidence indicating that prolonged screen exposure is associated with adverse ocular symptoms among students. Although the sample size was limited, the findings highlight the importance of promoting healthy digital habits, increasing awareness regarding preventive measures, and encouraging regular eye-care practices among students.

FUTURE RECOMMENDATIONS

1. Implementation of Eye Health Education Programs: Universities and schools should conduct regular awareness campaigns regarding digital eye strain, Computer Vision Syndrome, and preventive strategies such as the 20-20-20 rule.

2. Promotion of Healthy Screen Habits: Students should be encouraged to limit unnecessary screen exposure, maintain appropriate viewing distances, and avoid prolonged continuous device use without breaks.

3. Integration of Ergonomic Guidelines: Educational institutions should provide guidance on proper workstation ergonomics, including screen positioning,

seating posture, and adequate lighting conditions to minimize visual stress.

4. Routine Eye Examinations: Regular ophthalmological screening programs should be organized for students to facilitate early detection and management of screen-related ocular problems.

5. Further Large-Scale Research: Future studies should involve larger and more diverse student populations using validated assessment tools and objective ocular measurements. Longitudinal studies are also needed to evaluate the long-term effects of digital screen exposure on visual health and academic performance.

Implementation of these recommendations may help reduce the burden of screen-related eye problems and improve overall ocular health among students in increasingly digital educational environments.

CONCLUSION

The present study evaluated the effects of screen time on eye health among students and demonstrated that prolonged digital device use is associated with a variety of ocular symptoms, including eye strain, headaches, dry eyes, and blurred vision. Smartphones and laptops were the most commonly used devices, primarily for educational activities, social media engagement, communication, and entertainment. A substantial proportion of participants reported experiencing visual discomfort following extended screen exposure, indicating that digital eye strain represents an important health concern among students.

The findings revealed that increased screen exposure was associated with a greater frequency of eye-related symptoms. Eye strain emerged as the most commonly reported complaint, followed by headaches, blurred vision, and dryness. In addition, many participants reported screen use before bedtime and maintained suboptimal viewing distances, both of which may contribute to visual fatigue and ocular discomfort. Although several students adopted preventive measures such as screen filters, blue-light glasses, brightness adjustment, and regular breaks, awareness of

evidence-based strategies such as the 20-20-20 rule remained limited.

The results are consistent with previous research demonstrating a strong relationship between prolonged digital device use and Computer Vision Syndrome. As digital technology continues to play a central role in modern education, promoting healthy screen habits has become increasingly important. Educational interventions, ergonomic improvements, and regular eye examinations may help reduce the occurrence of screen-related ocular symptoms among students.

In conclusion, excessive screen time may negatively affect eye health and visual comfort among students. Increasing awareness regarding proper digital device use and encouraging preventive eye-care practices are essential steps toward minimizing the adverse effects of prolonged screen exposure and supporting long-term ocular well-being.

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