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Research Article

PREVALENCE OF DIGITAL EYE STRAIN AMONG MEDICAL STUDENTS DURING COVID-19 PANDEMIC

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A R T I C L E I N F O

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A B S T R A C T

Background: Students worldwide may now be at risk for developing digital eyestrain due to increased use of digital gadgets and mandatory e-learning requirements imposed during the Covid-19 pandemic curfew. **Aim:** The study's objectives were to evaluate the prevalence of digital eyestrain among medical students as well as the amount of time spent on screens for e-learning and social media use. **Materials and methods:** This cross-sectional questionnaire-based study was conducted among 117 undergraduate medical students studying in KMCH, Guntur in May, 2021. A pre-designed, semi-structured questionnaire was made available digitally as a Google Form to collect data. **Results:** Eyestrain symptoms were more common in students, with 53% of students complaining of aesthenopia and 1.70% students complaining of double vision. Aesthenopic symptoms were the most prevalent symptom among the students. The next most prevalent symptom was a headache, which was followed by light sensitivity, tearing, dry eyes, blurred vision, stinging, itching, redness, and diplopia. **Conclusion:** The majority of students had digital eye strain, with eye fatigue and headaches being the most often reported symptoms. Efforts should be made to increase awareness of and prevent digital eyestrain in order to safeguard eye health and lessen this workplace threat.

INTRODUCTION

Digital eyestrain is a group of eye and vision-related problems that result from prolonged computer, tablet, e-reader and cell phone use.[1] It is the most prevalent eye condition and is characterised by symptoms like dry eyes, headaches, itching, foreign body sensation, watering, and blurred vision.[2]

Medical institutions in India closed in March, 2020 after the Covid-19 pandemic hit. The pandemic has replaced the conventional teaching strategy of using blackboards with online classes supported by digital devices. Online classes started soon afterwards and all students were required to attend classes through various e-platforms. In view of Covid-19 pandemic, the National Medical Commission approved the conduct of online classes for medical course.[3]

In this study, we aim to assess the prevalence and symptomatology of Digital Eye Strain among medical students during the COVID-19 lockdown.

The common ocular symptoms experienced are headache, dry eye sensation, blurred vision, tearing, burning, itching and photophobia.[4] The prevalence of digital eye strain is estimated to range from 25% to 93%, as reported in various studies.[5,6,7] Reddy *et al*. reported symptoms in 89.9% of students in their questionnaire-based study.[7] Higher prevalence rates were observed in adolescents using smartphones whose screen time exceeded 2 hrs daily.[8]

Ocular symptoms associated with excessive digital device use are because of longer online course lengths in this COVID era have received a lot of media attention, but they haven't been thoroughly investigated and reported on in the literature.
Students' eyes can become tired from staring at a digital screen, which may cause vision issues later in life. Students' myopia progression can also be accelerated by extended near work and a decline in outside activities.[9] These variables have become far more prevalent as the pandemic continues and are quite concerning. Online instruction is an excellent educational tool, but it must be used carefully, taking into account both the benefits and drawbacks of using a digital screen.

MATERIALS AND METHODS

This cross-sectional questionnaire-based study was conducted between December 1 to 30, 2020 among 117 undergraduate medical students studying in KMCH, Guntur.

A pre-designed, semi-structured questionnaire was made available digitally as a Google Form after receiving approval from the Institutional Ethics Committee. It was used to gather information on age, gender, eye care history, screen time on various devices, time spent learning online and on social media, computer vision syndrome symptoms (based on CVS-Q questionnaire [10] and OSDI questionnaire), and computer vision syndrome symptoms[11] and M Lograj *et al*.[12]

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The CVS-Q questionnaire measures the frequency and severity of 16 eyestrain symptoms, including burning, itching, foreign body sensation, excessive blinking, redness, pain, heaviness, dryness, blurred vision, diplopia, difficulty in near work, light sensitivity, coloured halos around objects and headache.

Inclusion criteria

Third year Undergraduate medical students

Students who attended online classes during COVID-19 pandemic.

Exclusion criteria

Students with symptoms of dry eyes before starting online classes Students with pre-existing ocular pathologies other than refractive errors.

Students who gave a history of ocular surgery

The study participants were asked to fill this electronic Google forms based questionnaire. It was used to collect data on eye care history, screen time spent on different devices, time spent for e-learning and on social media.

A total of 117 complete responses were received and all responses were taken for the study.

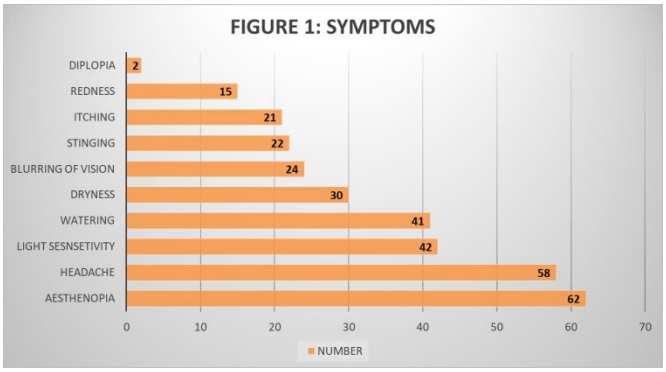
The data was entered in Excel sheet. Descriptive analysis was carried out in the form of frequency, percentage.

RESULTS AND OBSERVATION

117 students responded completely to the questionnaire

Table 1 Screen Time Hours Spent Online

HOURS	%	NO OF STUDENTS
1-3	7.69	9
4-6	35.90	42
7-8	33.33	39
9-12	18.80	22
12-18	3.42	4
18-24	0.85	1



DISCUSSION

Due to the spread of the COVID-19 pandemic worldwide, many states or central governments have decided to close schools in order to maintain social distancing, as means of halting the transmission of this deadly virus. However, the closure of schools has affected the education of more than 1.5 billion children and youth worldwide.[13]

Table 1 shows the number of hours spent watcing digital screens per day. Most number of students i.e., 42 (35.90%) spent about 4-6 hours per day. About 39(33.33%) students spent about 7-8 hours on watching digital screens per day, followed by 9 – 12 hrs by 22 students, 1-3 hours by 9 students, 12 –18 hours by 4 students and 1 student watches about 18 – 24 hrs.

The average time spent in front of digital devices in our study was 3.9 ± 1.9 (range 1–9) h, which is similar to a study done in the UK, in which the participants spent approximately 4 h per day on digital devices.[14] A study conducted in rural western India, they reported that the average time spent in front of a screen among children was approximately 2.7 ± 1.7 h.[15]

Prevalence of eyestrain symptoms ranged from 53% for aesthenopia to 1.70% for double vision. Most common symptom seen among the students were aesthenopic symptoms. 53% (n=62) of the students complained of aesthenopic symptoms.

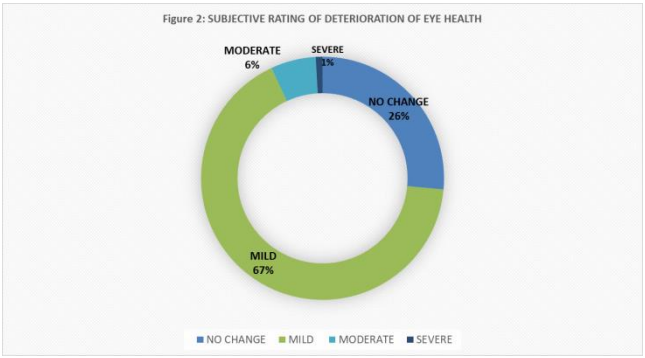
Next most common symptom was headache seen in 58 students (46.2%), followed by light sensitivity seen in 42 students, watering seen in 41 students, dryness of eyes seen in 30 students, blurring of vision seen in 24 students, stinging of eyes seen in 22 students, itching of eyes seen in 21 students, redness of eyes seen in 15 students, diplopia in 2 students.

Eye pain was experienced by 53% of students. A lower prevalence of 29% was seen in a study done by Bahkir FA *et al.*[16]

Altalhi *et al*. reported a higher prevalence of 58% and 63% of tearing and itching respectively.[17]

Dryness of eyes were reported by 25.6% in our study. Althahi *et al*. reported a prevalence of 48.3% and prevalence of 21% was reported among a student population in Tamil Nadu by Niveditha KP, Dheepak Sundar M**,** during the Covid 19 lockdown.[18]

Red eye was also seen in 12.8% students but it had a lower prevalence of 13.9% was reported as the least common eyestrain symptom among medical students by Logaraj *et al*.[12]



As a last question the students were asked how they rate their eye health status before and after using e-learning mode and 31 students did not observe any change , where as majority 78 students i.e., 66.7% answered they felt mild changes in their eye health, 7 answered moderate changes.

CONCLUSION

This was a cross sectional study on 117 undergraduate medical students to assess the digital eye strain Limitation of this study

was that digital eyestrain was assessed based on self-reported symptoms and not by ophthalmic examination. This study revealed that around three -fourth of the student population experienced at least one symptom of eyestrain Digital eye strain was seen in >40% of students and eye fatigue & headache were the most common symptoms reported. To protect eye health and minimise this work hazard, steps should be taken to raise awareness of and prevent digital eyestrain. The symptoms might be reduced by looking at distant things while working, viewing the monitor at an angle below eye level, massaging the eyes, and using eye drops.

Solutions to digital screen-related vision problems are varied. Eyeglasses or contact lenses prescribed for general use may not be adequate for computer work. Lenses prescribed to meet the unique visual demands of computer viewing may be needed. Special lens designs, lens powers or lens tints or coatings may help to maximize visual abilities and comfort

Conflict of Interest

Nil

Financial Interest and Sponsorship

Nil

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QUESTIONNAIRE

- Hours spent in e-learning per day
  Total hours spent including e-learning and other usage on phone or tablet or computer

  1 – 3 4 – 6 7 – 8 8 – 12 >12 hrs
- Do You Have Any Of The Symptoms Below (answered in yes or no)
  - ✓ STINGING OF EYES
  - ✓ TEARINESS/WATERING
  - ✓ ITCHING
  - ✓ AESTHENOPIA
  - ✓ DOUBLE VISION
  - ✓ REDNESS
  - ✓ BLURRING OF VISION

- ✓ SENSITIVITY TO LIGHT

- ❖ Any other associated symptoms? Do mention if any
- ❖ Refractive errors, if yes using corrected spectacles?
- ❖ How Do You Rate Your Eye Health Status Before And After Using E-Learning Mode

a) My eye health did not change
b) Mild deterioration
c) Moderate deterioration
d) Severe deterioration

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