**Original Article**

# An Evaluation of Prevalence and Risk Factors of Computer Related Ocular Problems Among Engineering Students of Bangalore

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**Abstract**

*Introduction:* With the increasing use of technology for virtual classrooms, students are exposed to more of screen time be it computers or any Visual Display Terminals (VDT). This has resulted in a serious health issue known as Computer Vision Syndrome(CVS). Computer vision syndrome also referred to as digital eye strain is a condition in which a person experiences diverse set of ocular symptoms as a result of prolonged working on computer or any VDT's.[1] *Objectives:* This study was designed to evaluate the prevalence of CVS, the associated risk factors and awareness about the condition among the students of engineering college in north bangalore. *Materials and Methods:* a cross-sectional non interventional questionnaire based study was conducted among engineering students from may 2019 to oct 2019. Data was collected regarding the demography, use of spectacles/contact lens, duration of computer use, hours on computer per day, symptoms of CVS, awareness about CVS. *Results:* A total of 1000 students were enrolled for this study. The prevalence of CVS was found to be 82.3%. The most prevalent symptom was eye strain followed by headache. Significant association was found between increased hours of computer use and the prevalence of CVS (p<0.01). Though majority of students (76%) were aware of CVS only 24% of them were aware of the correct ergonomics. *Conclusion:* Extensive use of computers for work and recreational purposes is associated with an alarmingly high incidence of serious visual and other health problems. Clear and correct guidelines are needed to mitigate and reduce this health issue. Keeping this in mind, the health and educational professionals should pay considerable attention to CVS and adopt preventive measures to tackle this global health problem.

**Keywords:** Computer Vision Syndrome; Digital Eye Strain; VDT(Visual Display Terminal).

## Introduction

Now in the 21st century Computers and other Visual Display Terminals (VDT) have become an integral part of human life. The use of digital devices at Workplace, Universities, Schools and Homes for Education, Communication and Recreation has become necessity. The use of technology in our day to day lives is a double edged sword having both favourable and unfavourable consequences. Prolonged and extensive computer use poses serious health hazard both ocular and extraocular.

Computer Vision Syndrome (CVS), is commonly described as a group of eye and vision related problems, in particular near vision related problems, arising from extended and uninterrupted use of computer or digital screen use. It is also known as digital eye strain.[2] Common symptoms of CVS include dry and irritable eyes, eye strain/ fatigue, blurred vision, red eyes, burning eyes, excessive watering, double vision, headache, light/ glare sensitivity, slowness in changing focus and neck and shoulder pain that increases in severity with the increased use of Video Display Terminal (VDT).[3]

In a review on CVS by thomson showed that up to 90% of computer users have symptoms related

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to computer use.[4] Hence, it is likely that CVS will continue to create a significant and growing contribution to reduced productivity at work, while also compromising the quality of life of the computer user which is compared to a study by ranasinghe on office going adult population.[5] In the present scenario of covid pandemic, the increasing use of vdts be it for online classes, projects, self study or entertainment has made it difficult to reduce the screen time for students thereby increasing the burden of cvs. So this study was designed to find the prevalence of cvs and its associated risk factors at the student level. As well as to know the awareness of cvs among the students and the preventive measures taken to tackle the problem.

## Materials and Methods

A cross-sectional, non-interventional questionnaire based study was conducted among engineering students (Computer Science and Information Science Branch) in bangalore from may 2019 to Oct 2019.

All students who used computer for a minimum of six months were included in the study. Subjects were selected randomly regardless of their age, gender and visual status. Students who had existing eye disease and those who did not give consent to participate in the study were excluded.

The study was approved by the institutional ethical review board. In absence of uniform diagnostic criteria, a questionnaire was constructed based on previous study done by gangamma et al[6] on CVS. Questions included were about basic demographic data, hours of computer use per day, any ophthalmic or asthenopic symptom on using computers, any preventive measure taken to deal with symptoms, knowledge about computer vision syndrome. The students were asked to report eye symptom during or after use of computer and grade them as none, mild (transient symptoms persist for few minutes to hours), moderate (symptoms persistent for few hours and subsides on sleep or rest), severe (requiring medical consultation) visual problems during or after computer use.

To consider a symptom of Computer Vision Syndrome, symptoms should last for a day either during or after use of computer. Presence of any symptom mentioned in questionnaire either continuously or intermittently for at-least 1 week during or after computer use in the last one month was considered as presence of computer vision syndrome.

The data collected was analysed statistically using spss version 22. The descriptive data were presented as percentages and chi-square test to measure the strength of association and 95% confidence intervals were calculated.

## Results

### Demographic Profile

A total of 1000 students were included in this study based on inclusion criteria of which 46.3% Were females, while 53.7% Were males (Fig. 1).
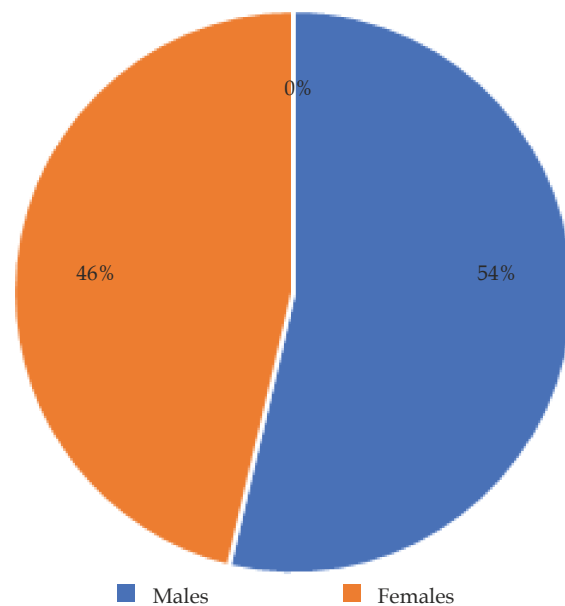


**Fig. 1:** Demographic Details

About 47% students were wearing spectacles or contact lens. Among them 68% (n=320) were using only spectacles, 30% (n=141) were using both spectacles and contact lens and 2% (n=9) were using only contact lens (Fig. 2).
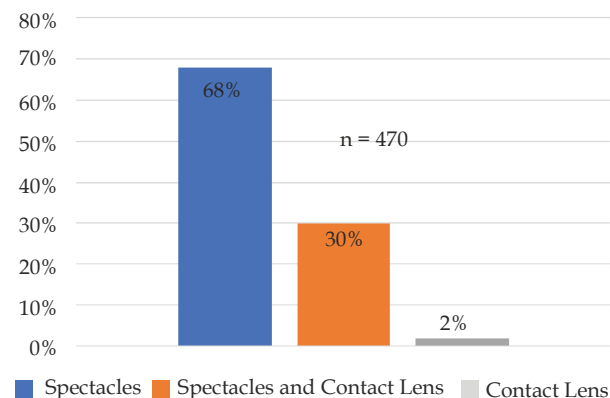


**Fig. 2:**

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Out of total study subjects, 823 students reported history of one or more symptom of computer vision syndrome. Prevalence of Computer Vision Syndrome was found to be 82.3%. The commonest ocular symptom associated with computer usage was eyestrain complained by 640 (64%) students followed by headache in 182 students (28.2%) (Fig. 3).
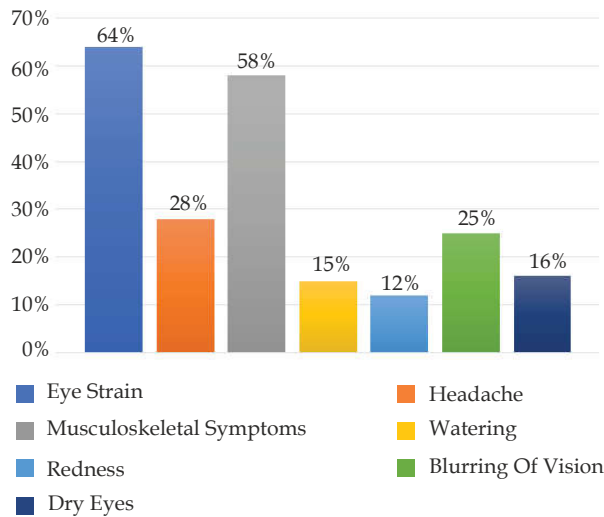


**Fig. 3:** Symptoms of CVS.

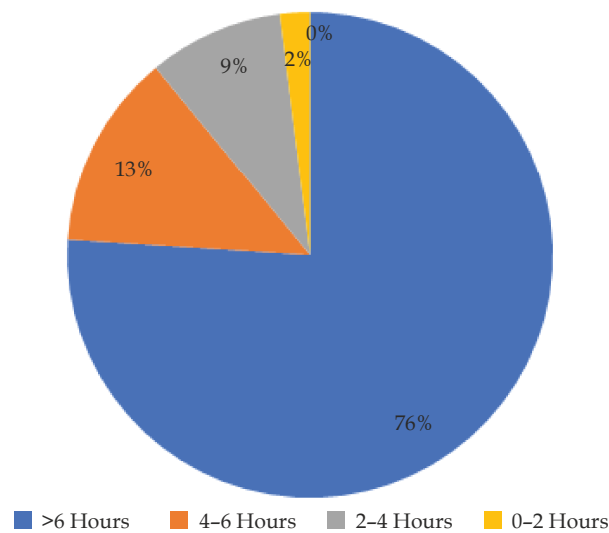Majority of students were using computers for more than 6 hours a day (Fig. 4).



**Fig. 4:** Hours on Computer.

Table 1 showed that students who used computer for more than 6 hours were at significantly higher risk of computer vision syndrome compared to those who used computer for less than 6 hours (p<0.01). Significant correlation was found between increased hours of computer use and symptoms of Computer Vision Syndrome.

**Table 1:** Association of CVS with hours of Computer use.

| Hours on Computer | N | CVS Present (N) | % | CVS Absent (N) | % |
|---|---|---|---|---|---|
| 0–2 | 20 | 3 | 12 | 17 | 88 |
| 2–4 | 90 | 21 | 23 | 69 | 77 |
| 4–6 | 130 | 55 | 42 | 75 | 58 |
| >6 | 760 | 490 | 64 | 270 | 36 |

*Preventive Measures*

Majority 76% of study population were aware about Computer Vision Syndrome but among them only 24% were aware about ergonomics of computer usage and preventive measures of Computer Vision Syndrome. The most common preventive measure adopted by students to relieve the ocular symptoms was taking breaks between computer use by 56% followed by use of VDT filters by 23%.

**Discussion**

The present study was conducted among 1000 engineering students of Bangalore. The prevalence of Computer Vision Syndrome in study population was found to be 82.3%. The prevalence was almost similar to other studies. Logaraj and Madhupriya reported prevalence of CVS between Medical & Engineering students were 78.6% And 81.9% Respectively.[7]

Most common symptom in our study was eyestrain and headache. These findings was consistent with study by sen a, richardson s which showed eye fatigue, headache and burning sensation as predominant symptoms.[8]

The present study found significant association between increase in hours of computer usage with the risk of computer vision syndrome. Student who spent time on computer for more than 6 hours were at high risk of compared to students who used computer for less hours. These results were consistent with a study by shrivastava and bobhate which found that visual symptoms increased with the increase in working hours on the computer.[9] Our study has pointed out serious threat to vision related health problems with increase time spent on computer and other VDT.

In our study the majority of students (760) were aware of health issues with use of computers but only 240 students had knowledge about ergonomics and preventive measures of CVS. In our study the most common practiced preventive measure to relieve the ocular symptoms due to computer use was taking frequent breaks while on computer.

This finding is consistent with result of a study by brewer which recommend frequent breaks and interventions to improve workplace ergonomics and will help to avoid computer vision syndrome.[10]

Limitation of our study was it was a cross sectional and it included students of a single university. This study didn't include ophthalmic examination and the severity of symptoms reported were subjective without any uniform diagnostic criteria. So further prospective follow-up study was required to know other associated risk factors and any permanent damage to eyes.

**Conclusion**

In this era of internet and online activities, computer and other VDT's have brought a change in overall lifestyle but at same time there is an alarming high incidence of serious vision and other health problems associated with extensive use of computers. Technology use by students is here to stay. So clear and correct guidelines are needed to mitigate and reduce this health issue. The health and educational professionals should consider these aspects and adopt preventive measures to tackle this global health problem.

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