

# Awareness and Symptoms of Computer Vision Syndrome among Computer Users

Bindu Thampi<sup>a</sup>, Antony J<sup>a</sup>, Ajith Mohan M<sup>a</sup>, Varsha Vijayan<sup>a</sup>

a. Department of Ophthalmology, Sree Gokulam Medical College, Trivandrum, Kerala, India\*

## ABSTRACT

Published on 21<sup>st</sup> December 2020

**Background:** Computer Vision Syndrome (CVS) is a series of visual symptoms caused by excessive viewing of Visual Display Terminal (VDT) screens without proper attention to practical visual hygiene. This study was to assess the awareness and extent of symptoms of Computer Vision Syndrome among computer users.

**Materials & Method:** Cross-sectional study conducted between January and May 2014. Structured questionnaire was given to 220 computer users 20-40 years of age.

**Results:** Data was collected from 220 computer users (106 males and 114 females). Median age was 29.83. About 79% indicated 'yes' to at least one symptom. 25.9% were aware of Computer Vision Syndrome. Most common symptom was headache (37.35%). The other symptoms were eye strain (29.88%), dryness (15.51%), watering of eyes (12.06%), and others symptoms like blurred vision, redness (5.2%). All of them used computers with screen at the level of eyes.

**Conclusion:** CVS is a significant occupational hazard in people using VDT for prolonged duration. Computer Vision Syndrome symptoms was experienced by 79% of computer users in the study group with common symptom being headache. Proper awareness and preventive measures such as work place ergonomics may help in reducing the incidence.

**Keywords:** Computer Vision Syndrome, Dry Eye, Visual Hygiene

\*See End Note for complete author details

## INTRODUCTION

Computer Vision Syndrome (CVS) is a series of visual symptoms caused by excessive viewing of VDT screen without proper attention to practical visual hygiene<sup>1,2,3</sup>. It is characterized by a complex group of eye and vision related problems that result from prolonged computer use. As computers become unavoidable part of our everyday life, more and more people are experiencing a variety of ocular symptoms related to computer use. These include eyestrain, tired eyes, irritation, redness, blurred vision, and double vision, collectively referred to as computer vision syndrome. CVS remains an underestimated and poorly understood issue at workplace. About 70% of computer workers worldwide report having vision problems and there is an alarming increase in the number of people affected<sup>4</sup>. Some decades back, before the advent of computers, the office work involved a range of activities, including typing, filing, reading and writing etc. All these activities are different from each other and needed different types of posture and vision, causing a natural break from each activity. Studies by Sheedy and

coworkers suggest that 1 out of 6 patients requiring eye examinations have a computer-related eye problem. Hales and coworkers previously reported that approximately 22% of computer workers have musculoskeletal problems, such as neck problems, back problems, shoulder problems, and/or carpal tunnel syndrome.<sup>1,5</sup>

It is difficult to point out a single etiologic factor which causes computer vision syndrome but it is a combination of several factors like prolonged working hours, inadequate rest breaks constantly staring at a single source are some of the important causes of computer vision syndrome.<sup>2,6</sup> Studies have shown that The computer monitor is populated by tiny dots called pixels, the computer screen is difficult for the eye to focus on and these pixels are not uniformly bright and produce slight difference in contrast as a result of which even at high resolutions the edge of the letter looks fuzzy this adds to strain on eyes and is one of the important cause of computer vision syndrome.<sup>3,7</sup> Most people work 6-7 hour days. If you take a 1 hour lunch break, this still leaves 3.5-4 hour periods during which you are staring at a computer screen. Extended

Cite this article as: Thampi B, Antony J, M AM, Vijayan V. Awareness and Symptoms of Computer Vision Syndrome among Computer Users. IMA Kerala Medical Journal. 2020 Dec 21;13(4):127-30.

### Corresponding Author:

Dr Bindu Thampi, Associate professor, Department of Ophthalmology, Sree Gokulam Medical College, Trivandrum, Kerala, India. E-mail: binduramesh96@gmail.com

viewing of a computer screen (over 2 hours), especially at a constant depth of field, is the primary cause of CVS. The discomfort associated with computer usage has not yet been proven to result in permanent damage, but may cause a reduction in work accuracy. This can reduce productivity by as much as 40%.

Some researchers explain that CVS can be avoided by suitable preventive actions but majority of the sufferers are ignorant of this. The aim of this study is to assess the awareness and extent of symptoms of Computer Vision Syndrome among computer users and to advise measures to reduce the occurrence in computer users.

## MATERIALS AND METHODS

This is a hospital based descriptive study conducted in the Department of Ophthalmology in a tertiary care centre in rural area of Kerala, India. The study was conducted over a period of five months, from January to May, 2014. A total of 220 computer users of 20 to 40 years were included in this study. Sample population were selected from patients came to the Ophthalmology department over that study period, and who are willing to participate in the study. Computer users older than 40 years, contact lens wearers, those having arthritis, xerostomia, those on systemic medications causing dryness like anticholinergics, antihistamines, antidepressants, diuretics were excluded from the study.

Demographic characteristics, pattern of usage of computers and associated visual symptoms were recorded in a validated self-administered questionnaire. The study was conducted after obtaining an informed consent from Institutional Ethical Committee (IEC). The data entry was done in Microsoft excel, and the analysis was done by using Statistical Programme for Social Science (SPSS 17).

## RESULTS

Majority of the respondents 138 (62.7%) were between the ages of 26 and 31 years, with a median age of 29.83years, and 36 to 40 years was only 32 (14.6%) respondents (Table 1).

Age Group (yrs.)	Frequency	Percentage (%)
23-25	22	10
26-28	70	31.8
29-31	68	30.9
32-34	28	12.7
35-37	16	7.3
38-40	16	7.3

Table 2. Average hours spent on computer daily by respondents

Average time (hours)	Frequency	Percentage (%)
1-2	4	2
3-5	73	33
6-8	106	48
>8	37	17

The majority 106 (48%) users spend 6-8 hours on the computer daily, followed by 73(33%) who spent 3-5 hours, 37(17%) > 8 hours and 4(2%) 1-2 hours. (Table 2).

Table 3. Duration of computer use by the respondents

Duration (yrs.)	Frequency	Percentage (%)
<1	13	6
1-2	33	15
3-5	66	30
6-8	64	29
>8	44	20

Only 13 (6%) of the respondents have been using the computer for less than 1 year, 33 (15%) of them had been using computer for between 1-2 years, 66(30%) have used the computer for a duration of 3-5 years, 64(29%) have been using computer for between 6-8 years and 44 (20%) have used the computer for more than 8 years (Table 3).

Table 4. Awareness of CVS

Aware of CVS	Frequency	Percentage (%)
Yes	57	25.9
No	163	74.1

Of the respondents, 57 (25.8%) were aware of CVS (Table 4).

174 respondents (79%) indicated 'Yes' to at least one symptom experienced during computer use. 46 respondents (21%) indicated 'No' to the symptoms. Out of 174 who were symptomatic, the most common symptom was headache reported by 65(37.35%) and eyestrain by 52(29.88%). The other symptoms experienced were dryness by 27 (15.51%), watering of eyes were reported by 21(12.06%). 9(5.2%) reported other symptoms (blurred vision, redness and double vision). (Figure 1)

## DISCUSSION

In 2000, it was estimated that 75% of jobs involved computer use. It seems likely that this number has now increased and when combined with non-vocational

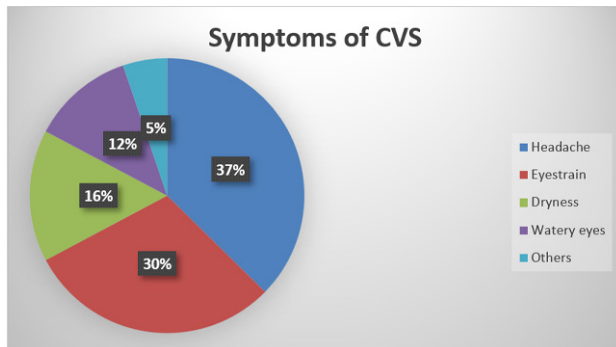


Figure 1. Symptoms of CVS

computer use for email, internet access and entertainment, computer usage is now almost universal.

About 60 million people suffer Computer Vision Syndrome globally. Computer Vision Syndrome is caused by decreased blinking reflex while working long hours focusing on computer screens and relatively limited range of ocular movements.<sup>5,6,7</sup> Normal blink rate is about 16-18 blinks per minute. Also the near focusing effort required for such long hours puts strain on the ciliary muscle of the eye. This introduces symptoms of asthenopia leading to a feeling of tiredness in the eyes after long hours of work. The cause of visual complaints is a combination of individual visual problems, poor workplace conditions and improper work habits.<sup>3</sup> The symptoms of CVS are headache, eyestrain, blurred vision, dry eyes, neck or shoulder pain.

79% of participants in our study had mentioned to have at least one computer-related eye symptoms. The prevalence of CVS according to M. Logaraj et al among students in Chennai was 80.3%.<sup>8</sup> Rahman and Sanip reported 68.1% prevalence of CVS among University staff in Malaysia.<sup>9</sup>

Headache (37.35%), eyestrain (29.8%) and dryness (15.51%) were the most common symptoms reported in our study. In a study by N. Shantakumari et al in March 2014, the most common symptoms reported were headache (53.3%) and burning sensation (54.8%)<sup>10</sup>. Other studies also show headache and asthenopia to be the most common symptoms.<sup>8,11</sup>

In our study out of 174 symptomatic patients, 114 were females and 70 were males. Headache was the most common symptom in females. Other studies also show that CVS was more in females<sup>12</sup> and symptom of headache was significantly higher in females.<sup>8</sup> Female patients as compared to male patients tend to have a reduction in the tear film's aqueous layer with increasing age.

Our study showed that only 25.9 % of the participants were aware of CVS. A study on knowledge, awareness and practices in Indian ophthalmologists with reference to Computer Vision Syndrome showed that all doctors who responded to the questionnaire were aware of CVS.<sup>13</sup>

Human focusing system responds well to images that have well defined edges with good contrast between the background and the letters. The characters on a computer screen are made of tiny dots called pixels. Pixels are the result of electronic beam striking the phosphor-coated rear surface of screen. These characters have blurred edges as compared to letters on a printed page with sharply defined edges. This makes it difficult for the eye to maintain focus, thereby leading to eyestrain and fatigue. Presence of glare and reflections on the screen also worsen the symptoms.

Large angle of gaze, short viewing distance, low humidity and excess room illumination may exacerbate symptoms of Computer Vision Syndrome. Computer users open their interpalpebral fissures more to look at their monitors, as opposed to others who look downwards at their reading material. Symptoms associated with CVS are diminished when computer users gaze downwards at an angle of 14 degrees or more. An upward gaze exposes 40% more of cornea, which dries out the tear film and compounds the effect of the already dry environment of most offices.<sup>7</sup> Also visual complaints were more pronounced with people employing a viewing distance of less than 10 inches from the computer. Computer work is particularly stressful for contact lens wearers. Long hours of non-blinking may cause the surfaces of most lens to dry out which can lead to discomfort and reduction in visual clarity. Uncorrected refractive errors may contribute to CVS due to fatigue with visual tasks.

The limitations of our study were that the symptoms were not correlated with the pattern of computer usage and were not analysed with regards to refractive errors, conditions at workplace such as distance of monitor, use of filters in screen, etc.

Management options include obtaining regular professional eye care, education of patients about good preventive vision care habits and proper computer use, making change in workplace ergonomics such as use of filters in screen, keeping gaze downwards at an angle of 14 degrees or more etc. Dry eye, a major symptom that is targeted in the therapy of CVS can be managed by the use of artificial tear drops. Prescription of special lens

designs, powers, tints, or lens coatings which may help maximize visual abilities and comfort can be advised.

In our study, most of the respondents kept the monitor straight and at arm length distance or less than that. Some of the respondents were using topical eye drops and systemic pain relievers for symptomatic relief after consulting a doctor. Only a few of them were taking proper measures to alleviate CVS.

## CONCLUSION

Computer Vision Syndrome has been recognized as an occupational hazard and has gained more importance in the recent years due to the upsurge in information technology and increased use of VDT for prolonged duration. Computer Vision Syndrome symptoms was experienced by 79% of computer users in the study group with common symptom being headache. Proper awareness and preventive measures such as work place ergonomics may help in reducing the incidence.

## END NOTE

### Author Information

1. Dr Bindu Thampi, Associate professor, Department of Ophthalmology, Sree Gokulam Medical College, Trivandrum, Kerala, India
2. Dr Antony J, Prof and HOD, Department of Ophthalmology, Sree Gokulam Medical College, Trivandrum, Kerala, India
3. Dr Ajith Mohan M, Resident, Department of Ophthalmology, Sree Gokulam Medical College, Trivandrum, Kerala, India
4. Dr Varsha Vijayan, Resident, Department of Ophthalmology, Sree Gokulam Medical College, Trivandrum, Kerala, India

**Conflict of Interest:** None declared

## REFERENCES

1. James.E.Sheedy OD PhD. Dry Eyes at VDTS. Eye Care Technology Fall 1994 p 52 – 79.
2. A review of physical exercises recommended by VDT Operators. Applied Ergonomics Dec 1992, Vol 23, No5.
3. Trusiewicz. D; Niesluchowska. M, Makszewska. Eyestrain symptoms after work with a computer screen. Klin Oczna 1995; 97: 343 –45.
4. Sources from various associations: American Optometry Association (AOA), American Academy of Ophthalmology (AAO), National Institute of Occupational Safety and Health (NIOSH)
5. Blehm.C, Vishnu S, Khattak A, Mika. S, Yee.R.W..Computer Vision Syndrome: A review. Surv.Ophthalmol 2005;50: 253-62.
6. Freudenthalu N, Neuf. H, Kadner.G, Schlote T. Characteristics of spontaneous eye blink activity during video display terminal use in healthy volunteers. Graefes.Arch Clin.Exp. Ophthalmol 2003; 241: 914-20.
7. Biswas NR, Nainiwas S.K, Das GK, Langan U.,Dadeya.SC, Mongre et al. Comparative randomized controlled trial of herbal eye drop with artificial tears and placebo in Computer Vision Syndrome. J. IndianMed Asso: 2003; 102: 208 – 9.
8. M Logaraj, V Madhupriya, SK Hegde. Computer Vision Syndrome and Associated Factors Among Medical and Engineering Students in Chennai..Ann Med Health Sci Res. 2014 Mar-Apr; 4(2): 179–185.
9. Rahman ZA, Sanip S. Computer user: Demographic and computer related factors that predispose user to get computer vision syndrome. Int J Bus Humanit Technol 2011;1: 84–91.
10. N Shantakumari, R Eldeeb, J Sreedharan,K Gopal. Computer Use and Vision-Related Problems Among University Students In Ajman, United Arab Emirate. Ann med health sci res2014 Mar; 4(2):258-63.
11. Sen A, Richardson S. A study of computer-related upper limb discomfort and computer vision syndrome. J Hum Ergol (Tokyo) 2007; 36:45–50.
12. Toama Z, Mohamed AA, Hussein NA. Impact of a guideline application on the prevention of occupational overuse syndrome for computer users. J Am Sc. 2012; 8 :265–82.
13. Bali J, Navin N, Thakur BR. Computer vision syndrome: A study of the knowledge, attitudes and practices in Indian ophthalmologists. Indian J Ophthalmol. 2007; 55:289–94.