

## Original Research Article

# Awareness of computer vision syndrome and related factors among information technology professionals

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### ABSTRACT

**Background:** Extensive use of computers for both professional and personal purpose has led to an increase in computer related health problems. Aim of this study was to evaluate the awareness regarding symptoms and the related factors in computer vision syndrome (CVS) among a group of information technology (IT) professionals.

**Methods:** This study was conducted among 300 IT employees. After obtaining informed consent, structured questionnaire was given and data collected and analyzed.

**Results:** Out of 300 respondents, 194 (64.7%) were males and 106 (35.3%) females. Mean age was 30.5 years. 48.3% had more than eight years of computer usage and 77.3% used computers on an average of 8-12 hours per day. About 201 (67%) of the participants had at least one ocular symptom, most common was dryness (96%). 94.7% reported eyestrain and 86.3% reported redness and itching. Dryness and eyestrain were more in males ( $p < 0.05$ ). Dryness, eyestrain and redness were more in those who used computers for more than eight years duration and for 8-12 hours/day ( $p < 0.05$ ). 253 (84.3%) were aware about this syndrome, the main source being internet. The main relief measure adopted was to take a break in between the work hours. Only 51.3% consulted a doctor for their symptoms.

**Conclusions:** In our study though 84.3% of IT professionals were aware of CVS and 67% had at least one ocular symptom, only 51.3% took professional advice for their problems. There is a definite need for awareness about corrective measures and treatment methods to be adopted for CVS among IT professionals.

**Keywords:** Computer vision syndrome, Information technology professionals, Awareness

### INTRODUCTION

In the present era of excessive and rampant computer usage, there has been an upsurge of computer related health problems.

Ocular problems of computer users have been grouped together and collectively termed as computer vision syndrome (CVS). It is defined as a complex of eye and vision problems related to activities, which stress the near vision and which are experienced in relation or during the use of computer.<sup>1</sup> Common symptoms of CVS include dryness, eyestrain, headache, redness, burning, tearing of eyes, double vision, blurred vision and neck or shoulder

pain that generally increase in severity with the amount of video display terminal use. This remains as an underestimated and poorly understood issue at workplace. About 70% of computer workers worldwide report as having vision problems and there is an alarming increase in the number of people affected.<sup>2</sup> Some researchers explain that CVS can be avoided by suitable preventive actions but majority of the sufferers are ignorant of this.

This study's aim was to evaluate the awareness regarding symptoms and the related factors in computer vision syndrome among a group of information technology (IT) professionals.

**METHODS**

This was a cross-sectional study conducted at Technopark campus, Trivandrum from March 2019 to June 2019. The study was conducted among 300 IT professionals. The employees who had at least six months of computer use preceding the start of study were randomly selected for this study. Those who did not consent to participate were excluded from the study. A detailed search in literature was done to create the questionnaire which was prepared in English. Participants were briefed about the purpose of the study. After obtaining informed consent from them, the prepared questionnaire was given and data collected.

Questionnaire consisted of five parts. Section A consisted of patient profile such as age, gender and qualification. Section B consisted of questions on computer use including years of computer use and hours of computer use per day. Section C consisted of questions on knowledge and symptoms of computer vision syndrome. Section D contained questions on attitude of participants such as use of antiglare protection, taking breaks during computer use, position of screen, level of top part of computer, brightness adjustment and illumination of room. Section E consisted of questions on the practices followed such as whether they have consulted a doctor and the relief measures adopted to alleviate their symptoms.

The study was conducted after getting institutional ethics committee approval. The data was analyzed at Sree Gokulam Medical College, Trivandrum.

Statistical analysis was performed with SPSS v20 (SPSS Inc Chicago, IL, USA). The association of symptoms of CVS with gender, duration of computer use, hours of computer use per day and various other associated factors were analyzed. A p value<0.05 was considered statistically significant.

**RESULTS**

Out of total 300 respondents 194 (64.7%) were males and 106 (35.3%) were females.

**Table 1: Gender and age distribution of the respondents.**

	Number	Percentage (%)
<b>Gender</b>		
Male	194	64.7
Female	106	35.3
<b>Age (Years)</b>		
20-25	46	15.33
25-30	115	38.33
30-35	120	40
35-40	13	4.33
>40	6	2

Mean age was 30.5 years (Table 1). Total 145 of the participants (48.3%) had more than eight years of computer usage and 29 % had used computer for 4 to 8 years (Table 2). 232 of them (77.3%) used computers on an average of 8-12 hours/day while only 3.7% used for<4 hours/day (Table 2).

**Table 2: Computer usage among respondents.**

	Number	Percentage (%)
<b>Duration of computer use</b>		
<1 year	16	5.3
1-4 years	52	17.3
4-8 years	87	29
>8 years	145	48.3
<b>Computer use per day</b>		
<4 hours	11	3.7
4-8 hours	37	12.3
8-12 hours	232	77.3
12-16 hours	20	6.7

About 67% (201) of the participants had at least one ocular symptom and the most common was dryness in 288 (96%) of them. 94.7% of them reported eyestrain and 72.7% of them had complaints of neck pain. Other symptoms noted were redness (86.33%), itching (85%) and watering (84%) (Table 3).

**Table 3: Ocular symptoms among the computer users.**

Symptoms	Number	Percentage (%)
<b>Dryness</b>	288	96.0
<b>Eyestrain</b>	284	94.7
<b>Redness</b>	259	86.3
<b>Itching</b>	255	85
<b>Watering</b>	252	84
<b>Blurring of vision</b>	242	80.7
<b>Irritation</b>	226	75.3
<b>Neck pain</b>	218	72.7

**Table 4: Association of symptoms with gender distribution.**

Gen der	Dryness	Eyestrain	Redness	Itching
<b>Male</b>	186 (p<0.05)	184 (p<0.05)	163	169
<b>Fem ale</b>	102	100	96	89

Dryness and eyestrain were found to be more in males compared to females which was statistically significant (p<0.05) (Table 4). Dryness, eyestrain and redness was found to be more in those participants with more than eight years of computer usage (Table 5) and in those

having around 8-12 hours of computer use per day (Table 6) and was found to be statistically significant ( $p < 0.05$ ).

**Table 5: Association of symptoms with duration of computer use.**

Years	Dryness	Eyestrain	Redness	Itching
<1	16	15	14	15
1-4	50	51	48	48
4-8	84	84	80	76
>8	138 ( $p < 0.05$ )	134 ( $p < 0.05$ )	117 ( $p < 0.05$ )	119

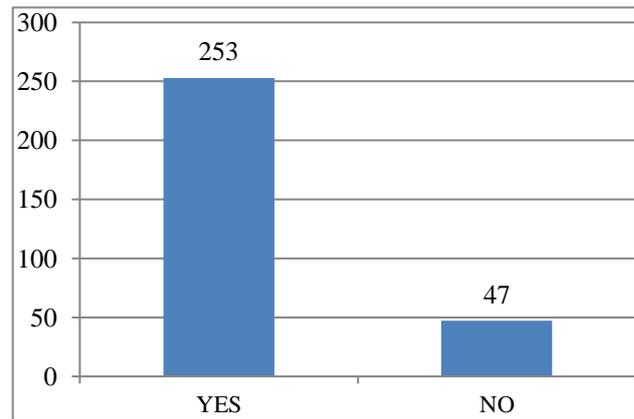
**Table 6: Association of symptoms with hours of computer use per day.**

Hours	Dryness	Eyestrain	Redness	Itching
<4	11	11	10	11
4-8	35	34	31	31
8-12	224 ( $p < 0.01$ )	220 ( $p < 0.01$ )	204 ( $p < 0.01$ )	199
12-16	18	19	14	17

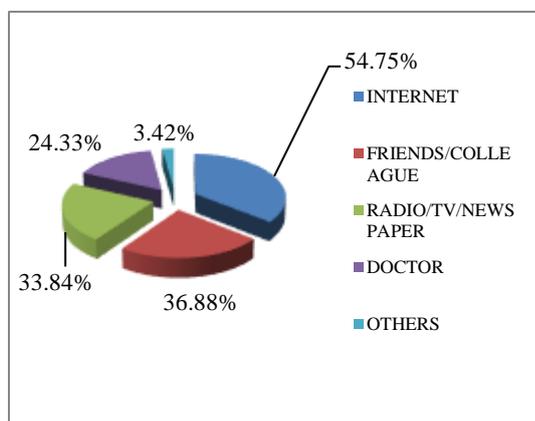
**Table 7: Association of various factors of computer use with symptoms.**

	Dryness (n)	Eyestrain (n)	Redness (n)	Itching (n)
<b>Not using spectacles with anti-glare protection</b>	181 ( $p < 0.05$ )	179 ( $p < 0.05$ )	163 ( $p < 0.05$ )	167 ( $p < 0.05$ )
<b>Taking breaks during computer use</b>	249	246	226	223
<b>Position of screen during computer use</b>				
<20 inches	96	93	79	79
20-24 inches	157	157	148	144
>24 inches	35	33	31	31
<b>Level of top part of computer</b>				
Below the level of eyes	134	149	136	118
At or above the level of eyes	152	134	118	135
<b>Brightness adjustment</b>	163	165	146	145
<b>Illumination of the room</b>	229	224	254	200

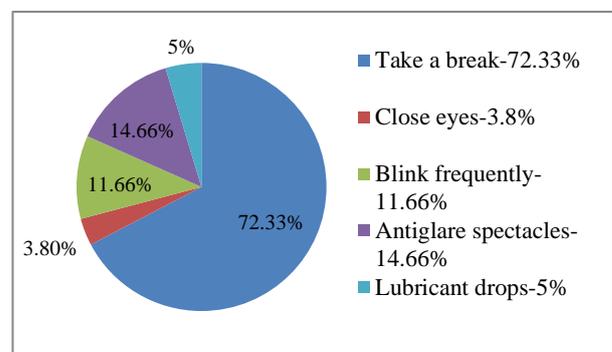
Total 253 (84.3%) of the participants were aware about CVS (Figure 1). The main source of information was the internet (54.75%) (Figure 2). Other sources of information were friends, relatives or colleagues (36.88%), media (33.84%) and doctors (24.33%).



**Figure 1: Awareness of CVS.**



**Figure 2: Source of awareness about CVS.**



**Figure 3: Relief measures adopted.**

The commonly reported symptoms like dryness, eyestrain and redness were more in those who were not using spectacles with anti-glare protection and was found to be

statistically significant ( $p < 0.05$ ) (Table 7). 190 of the participants (63.3%) use a spectacle for vision correction. 166 of them (58%) positioned themselves at a distance of 20-24 inches from the screen. 240 (80 %) of them use a screen with anti-glare protection. 171 (57.0%) of the participants used brightness adjustment during their work hours. All these related factors had no significant association with any of the maximally reported symptoms (Table 7).

## DISCUSSION

In our day to day life about 80% of jobs involve the use of computers. It seems likely that this number has now increased and when combined with non-vocational computer use for email, internet access and entertainment, computer usage is now universal.

About 60 million people suffer from CVS globally.<sup>3</sup> CVS is caused by decreased blink reflex while working long hours focusing on computer screen and relatively limited range of ocular movements. Normal blink rate is about 16-18 blinks per minute. The near focusing effort required for such long hours also puts strain on the ciliary muscle of the eye. This introduces symptoms of asthenopia or eye strain 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. The symptoms of CVS are headache, eye strain, double vision, dryness, blurred vision and neck pain.

The prevalence of CVS according to Assefa et al in a study done among bank workers was found to be 73%.<sup>4</sup> In another study done by Logaraj prevalence of CVS was 80.3% among medical and engineering students.<sup>5</sup> About 67% of the participants in our study had at least one ocular symptom and most of the participants had more than one ocular symptoms. Dryness of eyes (96%), eye strain (94.7%) and redness (86.33%) were the most common symptoms reported in our study. A study by Venkatesh et al also showed dry or irritated eye as the most common symptom of CVS.<sup>6</sup> In a study by Jatinder et al about CVS in Ophthalmologists using computers, the major symptoms reported were eye strain (97.8%), headache (82.1%), tiredness and burning sensation (79.1%).<sup>7</sup> In our study dryness and eyestrain were significantly more in males. This was similar to the study by Logaraj et al.<sup>5</sup> In some other studies proportion of females having symptoms of CVS were more than males.<sup>3,8</sup>

In our study dryness, eyestrain and redness were found to be significantly more in those participants with more than eight years of computer usage and in those having around 8-12 hours of computer use per day. This was similar to a study by Agarwal who reported that eyestrain, itching and burning sensation was higher in those who used computer for more than 6 hours/day.<sup>9</sup> Logaraj also reported significant increase in redness, burning sensation

and dry eyes with increase in number of hours spent on computer.<sup>5</sup>

Our study showed that 84.3% 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 were aware of CVS.<sup>7</sup> In a study by Amirul et al regarding CVS done among university staff in a Malaysian public university, 51.2% had knowledge about CVS.<sup>10</sup> In a study by Akinbinu and Mashalla among computer users in Nigeria only 25 % of the respondents were aware of CVS.<sup>11</sup>

In our study the main relief method adopted by the respondents to alleviate their symptoms was to take a break during continuous computer use (72.33 %). A study by Fenety et al has also shown that taking frequent breaks while using the computer increases the efficiency and relaxes the accommodation.<sup>12</sup> Agarwal et al in their study has reported that eye strain and burning sensation of eyes were found to be significantly more in subjects who did not take a break.<sup>9</sup>

In our study the commonly reported symptoms like dryness, eyestrain and redness were significantly more in those who were not using spectacles with anti-glare protection. Agarwal also found that complaints were more in those who did not use glasses, those who do not use anti-glare screens and brightness adjustment and in those who did not maintain a proper distance of 20-24 inches from computer.<sup>9</sup> They also found that complaints were less when subjects maintained top of the screen level below the eyes.<sup>9</sup> Our study could not find a significant correlation between the commonly reported symptoms of computer vision syndrome and any of these related factors.

The limitations of our study were that the symptoms were not analyzed with regards to refractive errors. The study was done among 300 IT professionals of a specific campus. The symptoms were self-reported and ophthalmic examination was not done to assess the symptoms.

Management options of CVS include obtaining regular professional eye care, education of computer users about proper method of computer use and making changes in work place ergonomics. Maintaining a proper viewing distance, use of an ergonomic position of computer chair, maintaining top of screen level below eyes and middle point of monitor 5-6 inches below the straight line of vision are some of the measures to be adopted.

Dryness which was the most common symptom can be treated by the use of artificial tear drops. Use of antiglare spectacles and taking breaks in between work hours also plays a vital role in the management.

## CONCLUSION

CVS significantly decreases work place productivity and reduces quality of life. In our study though 84.3% of IT professionals were aware of CVS and 67% had at least one ocular symptom, only 51.3% took professional advice for their problems. A significant association was found between symptoms of CVS and years of computer usage and hours of computer use per day. There is a definite need for awareness about corrective measures to be adopted at the work place and treatment modalities available for CVS among the IT professionals.

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*Ethical approval: The study was approved by the Institutional Ethics Committee*

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## ANNEXURE

### QUESTIONNAIRE

#### Section A: Biodata

Age:

Gender: Male/Female

Qualification:

#### Section B: Computer Use

1. For how many years have you been using computer.?  
(a) 6 months - < 1 year (b) 1-4 years (c) 4-8 years (d) > 8 years
2. For many hours per day do you use computer?

#### Section C

1. Do you experience any ocular problems?  
(a) Yes (b) No

If yes, which of the problems do you experience?

- i) Eyestrain Yes / No
- ii) Headache Yes / No
- iii) Watering Yes / No
- iv) Dryness of eyes Yes / No
- v) Redness Yes / No
- vi) Itching Yes / No
- vii) Burning Sensation Yes / No
- viii) Double Vision Yes / No
- ix) Blurring of Vision Yes / No
- x) Eye pain Yes / No
- xi) Irritation Yes / No
- xii) Neck Pain Yes / No

2. Whether you are aware that prolonged use of computer can cause computer vision syndrome?  
(a) Yes (b) No

If yes, how did you know about computer vision syndrome?

- (a) Friends/ relative / colleague (b) Radio / TV/ Newspaper/ magazine (c) Internet (d) Doctor (e) Others (Specify)

#### Section D

1. Do you use a spectacle for vision correction?  
(a) Yes (b) No
2. Do you use glasses with anti- glare protection for computer use?  
(a) Yes (b) No
3. Do you take breaks during computer use?  
(a) Yes (b) No
4. At what distance from the screen do you position yourself during computer use?  
a) < 20 inches from the screen. b) 20-24 inches from the screen. c) 24 inches from the screen.
5. What is the level of top part of your computer screen?  
(a) Below the level of eyes. (b) At or above the level of eyes.

6. Does your screen hold anti - glare protection?  
(a) Yes (b) No
7. Do you use brightness adjustment during the hours of your work?  
(a) Yes (b) No
8. What is the illumination of the room in which you use computer?  
(a) Bright (b) Dull

**Section E**

1. Have you consulted a doctor for any of your eye symptoms?  
(a) Yes (b) No
2. What do you do to get relief for your eye symptoms?  
(a) Take a break (b) Close your eyes (c) Blink more frequently  
(d) Use antiglare spectacles during computer use (e) Use of lubricant eye drops/ artificial tear drops.