



## Assessment of Computer Vision Syndrome in Software Professionals

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### ABSTRACT

**Background:** According to National Institute of Occupational Safety and Health, computer vision syndrome affects 90% people who spend more than 3 hours a day on the computer. It is a group of eye and vision related problems. It is a temporary condition resulting from focusing the eyes on a computer display for prolonged, uninterrupted period of time. Also different reactions of the eye and the brain to the characters on the screen cause strain. Hence, this study is planned to assess computer vision syndrome in software professionals. **Objectives:** To assess Computer Vision Syndrome by history and clinical examination. **Material and Methods:** An assessment survey was conducted in a convenient software company. A total number of 60 people in age group 28-40 years having minimum exposure of three years to computer everyday were recruited in the study. A questionnaire was developed to collect data about perceived symptoms on computer vision syndrome. **Results:** It was observed that 80% of subjects suffer from backache, wrist and shoulder pain. 72% subjects complained of eyestrain and 70% complained of dry and irritated eyes. 62% subjects complained of headache. More than 60% subjects gave history of watering and redness of eyes. **Conclusion:** Study shows that more than 60% subjects suffer from some or the other symptom of computer vision syndrome. Early detection and prevention of computer vision syndrome is necessary to prevent future complications and better health of software professionals.

**Keywords:** Computer vision syndrome, Software professional, Visual display terminal

### INTRODUCTION

The joys of technology have changed the way we work, study and play. Today's generation spends half their lives staring down at some screen. That stare down is causing many to suffer from computer vision syndrome. Computer vision syndrome holds the distinction of being called the no.1 occupational hazard of the 21<sup>st</sup> century.

According to the American Optometric Association, Computer Vision Syndrome is "the complex of eye and vision problems related to work which are experienced during or related to computer use [1]." Typically a person blinks 15 times/min. When a person is using a computer blinking is reduced to 4-6 times/min. Though not a dangerous condition, it may lead to eye strains.

According to National Institute of Occupational Safety and Health, Computer Vision Syndrome affects 90% people who spend more than 3 hours a day on the computer [2]. Statistics show that there are 10 million visits to the eye doctor every year and 16 new patients are treated every month for Computer Vision Syndrome. Use of computers for more than 3 hours a day is known to predispose Computer Vision Syndrome. In this condition, eye muscles work 3 times harder and blinking is reduced by 70%. Those who suffer from computer vision syndrome may have symptoms like eye strain, headache, blurred vision, dry eyes, light sensitivity, reddening, watering of eyes and back and neck pain. These symptoms result in gradual deterioration in the quality of life of an individual and also work productivity due to the fatigue associated with them [3]. Hence, this study is planned to assess computer vision syndrome in software professionals.

### MATERIALS AND METHODS

The study was conducted on computer users in different software companies in Pune. It was a cross sectional study. Institutional ethical committee approval was obtained. A total number of 60 people in the age group of 25 to 35 years were included in the study. Detailed history was asked in the form of a questionnaire which gives information regarding duration, nature of computer use, instrumental settings and problems faced during or after computer use. It was followed by their clinical examination. If required, certain stress relieving eye exercises were advised.

Depending on the working environment following questionnaire was given to the participants (Table 1):

1. Is the monitor supported on a stand/desk?
2. How often do you clean your monitor?
3. Do you work more than 3 hrs a day?
4. Do you take regular breaks during work?
5. Do you notice the screen flicker?
6. Does the screen have a glare filter?
7. Is the monitor at your eye level?
8. Is the reference material above the keyboard level?
9. Is the Visual Display Unit (VDU) close to your eyes? (less than an arm's distance)
10. Do you wear glasses while working at the Visual Display Terminal (VDT)?
11. Do you wear contact lens while working at the VDT?

Depending upon the symptoms for computer vision syndrome following questionnaire was developed (Table 2):

1. While reading, do you tend to skip/repeat lines?
2. Do you lose your place when moving from copy to screen?
3. When you look up from reading, do objects appear blurred?
4. Do you experience eyestrain?
5. Do you experience double vision?
6. Do you experience headache?
7. Do you experience backache/neck/shoulder/wrist pain?
8. Do you experience dry/irritated eyes?
9. Does your vision seem worse at the end of the day?
10. Do you experience watering of eyes?
11. Do you experience redness of eyes?

### Statistical Analysis

According to the information collected the data was analyzed and rate of computer vision syndrome was determined using statistical tests like percentage.

## RESULTS AND OBSERVATIONS

**Table 1 Subjects showing symptoms due to environment related questionnaire**

Questions	Percentage (%)
1. Monitor on a stand/desk	78.33%
2. Clean your monitor	93.33%
3. Work for more than 3 hrs/day	100.00%
4. Regular breaks	100.00%
5. Screen flicker	36.67%
6. Screen glare filter	23.33%
7. Monitor at eye level	81.67%
8. Reference material above the keyboard	53.33%
9. VDU close to eyes	65.00%
10. Wear glasses while computer use	41.67%
11. Wear contact lenses while computer use	5.00%

It was observed that most of the participants take care of environmental factors like cleaning of monitor, take regular breaks, monitor at eye level. But 36.67% participates experience screen flicker, 65% complain that VDU is close to eyes. Only 24% participants have screen glare filter.

**Table 2 Subjects show symptom related to computer vision syndrome**

Questions	Percentage (%)
1. Skip/repeat lines	61.7%
2. Lose place from copy to screen	46.7%
3. Objects appear blurred	36.7%
4. Eyestrain	71.6%
5. Double vision	25.0%
6. Headache	61.7%
7. Backache/neck/wrist/shoulder pain	80.0%
8. Dry/irritated eyes	70.0%
9. Vision seems worse at the end of the day	43.3%
10. Watering of eyes	63.3%
11. Redness of eyes	55.0%

It was observed that, 72% complain of eyestrain, 80% Participants experience Backache, wrist/shoulder pain, 70% had Dry/irritated eyes, 61.7% complained of Headache and more than 50% had Watering/redness of eyes.

## DISCUSSION

It is evident from the results that more than 60% subjects suffer from some or the other symptom of computer vision syndrome. Similarly, in a study conducted by Namrata Arora Charpe 90% people were suffering from computer vision syndrome [4].

In this national survey from a South Asian country, 1-year prevalence of CVS in computer office workers was 67.4 %. Similar results were obtained from Malaysia and Nigeria with 68.1% and 74% occurrence of CVS respectively [5,6]. Another study among medical and engineering students in Chennai has found a higher 80.3% prevalence of CVS [7].

In the present study, 80% Participants experience Backache, wrist/shoulder pain, 72% complain of eyestrain, 70% had Dry/irritated eyes, 61.7% complained of Headache and more than 50% had Watering/redness of eyes.

Similarly, in the study conducted in Sri Lankan computer workers, most common symptom reported was headache (45.7%), followed by dry eyes (31.1%) and pain in and around the eyes (28.7%) [8].

Also, Megwas and Aguboshim found that headache (41.8%), pain (31.6%) and eye strain (26.7%) were the most common visual symptoms among VDT users [9]. Headache was the most commonly reported symptom in computer

users in several other similar studies [5,10,11]. Headache is often accompanied by other symptoms of CVS, though many patients do not consider it to be a directly vision-related problem [12].

Probable causes for computer vision syndrome may be:

1. Adjustment of human eyes to architecture of the words on the computer by change in size of pupil, contracting extraocular muscle etc
2. Different reactions of the eye and the brain to the characters on the screen may cause strain.
3. The eyes tend to change the focus to a resting point and then refocus on the screen. This may need constant focusing and refocusing
4. Postural adjustment for use of computers also play important role
5. Instrumental settings like quality of screen, lighting at work environment [13]

The limitation of the study was that the sample size was small and follow up study should be carried out with preventive measures.

### CONCLUSION

Study shows that more than 60% subjects suffer from some or the other symptom of computer vision syndrome. Early detection and prevention of computer vision syndrome is necessary to prevent future complications and better health of software professionals.

### Future Recommendations

Few changes in working lifestyle can be done like, use of antiglare screen, proper location of the computer and brightness, regular breaks and eye exercises. It is suggested to follow “20-20-20 rule” that is for every 20 minutes, look at a 20 feet distant object for 20 seconds.

### DECLARATIONS

#### Conflicts of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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