

A Cross Sectional Study on Computer Vision Syndrome and Its Associated Factors among Computer Users

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Abstract: Background: In daily life, computers are helpful. Computers need near work, which lasts longer and causes more eye discomfort. Prolonged exposure to this discomfort causes a series of symptoms called Computer Vision Syndrome, a widely disseminated and largely unrecognized occupational hazard. Objectives: The objectives of the study were to determine the prevalence of computer vision syndrome among computer users within the age group of 20-60 years. To assess various factors related to computer vision syndrome among the study population. Methods: A cross-sectional study was carried out from March to June 2023 in computer users aged 20-60 years in the ANES engineering college, Visakhapatnam. A sample of 144 was taken and a predesigned, pre-tested questionnaire was used to obtain information. Results: The prevalence of computer vision syndrome (CVS) was found to be 72.9%. The most disturbing symptom was eyestrain, tired eyes, and sore eyes for about 57.6% of participants, headache and neck pain for 29.2%, backache, shoulder pain, and wrist pain for 23.6% of participants. Conclusion: A multifaceted approach to management is necessary for effective symptom reduction, including health education, regular short breaks, good posture while sitting to prevent neck and back pain, the correction of visual issues, and optimal room lighting. Keeping the computer screen away also helps to reduce eye strain.

Keywords: Computer vision syndrome, Eye discomfort, CVS prevalence, Health Education

1. Introduction

The usage of computers and other gadgets has become essential in every part of life due to the growth of modern technology. These gadgets are noted as essential 21st-century entities. They serve a variety of functions in workplaces, educational settings, households, and recreational areas.

Thus, increasing screen time can result in computer vision syndrome (CVS).^[1] According to estimates, there are over 60 million CVS patients worldwide, and 1 million new cases are reported yearly.^[2] 75% of computer users are affected by CVS, with those who spend more than 3-4 hours on a computer showing the most pronounced symptoms. Since personal computers are among the most widely utilized equipment, CVS will continue to have a substantial and growing impact on decreased workplace productivity while also negatively affecting the quality of life for computer workers. Dhaliwal N. et al.^[3] says that, Computer Vision Syndrome affects mental and physical well-being and impairs productivity.

American Optometric Association (AOA) defines CVS or digital eye strain as a group of eye and vision-related problems that results from prolonged usage of computers, tablets, e-readers, and cell phones for more than 3-4 hours per day which causes increased stress to near vision in particular.^[4] Symptoms of CVS include headache, blurred vision, eye fatigue, strain to eye, neck pain, dry eyes, diplopia, polyopia, difficulty in refocusing the eyes.^[5] Based on CVS questionnaire there are CVS categories of mild, moderate & severe. Various ergonomic factors can affect the

occurrence of CVS. The length of use, dim illumination, and illumination of the screen, surrounding conditions, and eyesight issues as well as an inadequately configured workstation consider the eye and vision issues related to computing device. Prolonged periods of screen exposure have become commonplace, impacting eyesight and contributing to the development of computer vision syndrome. Simple and cost-effective precautions can significantly reduce the likelihood of CVS.

In the current era of technological progress, an increasing number of students across various age groups are favoring computer-based learning, gradually transitioning to computers, laptops, mobile devices, and tablets for their educational and entertainment needs. This shift is particularly noticeable among the younger generation, affecting educational, recreational, and business activities.^[6] Given the increasing number of students incorporating computers into their daily lives, it is crucial to adopt preventive measures.^[7]

Existing research predominantly focuses on computer vision syndrome among software and IT professionals, who extensively engage with computers. This study aims to examine the prevalence of computer vision syndrome specifically among engineering students, acknowledging the substantial rise in the use of electronic devices such as computers, laptops, mobile phones, and tablets.

Objectives: To determine the prevalence of computer vision syndrome among computer users within the age group of 20-60 years. To assess various factors related to computer vision syndrome among the study population.

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2. Methods

Study design and setting:

A cross-sectional study was conducted from March to June 2023, targeting computer users aged 20 to 60 years within the student and staff population of ANES Engineering College in Visakhapatnam. All necessary permissions were secured from the relevant authorities, and formal approval was granted by the institutional ethics committee to conduct the study. Additionally, prior informed consent was obtained from all participants involved in the study.

Materials and methods:

The sample size was determined using a 60.3% prevalence and an 8% margin of error. The sample size with 95% confidence was found to be 144. A previously created and pre-tested questionnaire was used to collect data from a sample of 144 individuals.

Methods of measurement:

A research questionnaire was developed following an analysis of the papers on computer vision syndrome that were available. The questionnaire inquired about symptoms, work patterns, ergonomics, knowledge about CVS, the use of spectacles, and any preventative measures taken.

Data analysis

The Microsoft Excel spreadsheet was used for data entry. The SPSS version 22 software was used to perform statistical analysis with the use of descriptive statistics like mean and percentages. The p-value was determined and a comparison was made using the Chi square test.

Inclusion criteria:

All research participants who, during the previous six months, used a computer, laptop, or tablet for more than three hours a day or fifteen hours a week.

Exclusion criteria:

Students who were unwilling to participate in the study and study participants who had eye infections at the time of the study.

3. Results

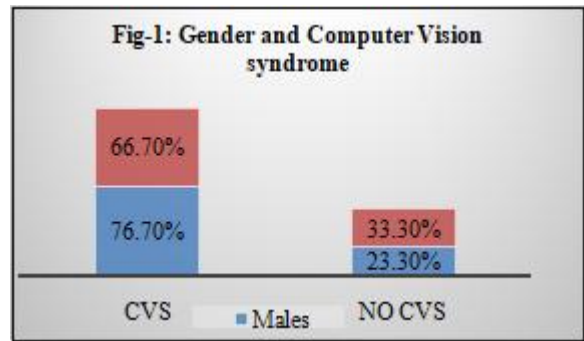
144 participants were included in this study. The mean age of study population was found to be 20.93±6.21 years. Out of 144 study participants, 90 (62.5%) were males and 54 (37.5%) were females.

Table 1: Distribution of study population according to age

Age group	No. of study participants	Percentage
≤ 21years	19	13.2
22-30years	100	69.4
31years and above	25	17.4
Total	144	100

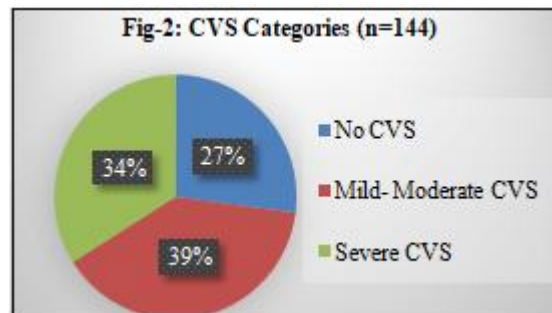
It was shown that 69.4% of the study population was in the 22–30 age range. Of the study population, 17.4% had an age above 31. 13.2% of research participants were under 21.

Fig-1 shows the presence of symptoms of CVS according to gender.



76.7% of women and 66.7% of men reported having symptoms of CVS (fig.1). Symptoms were more severe in men than in women. Four categories were created from the responses of the study participants to classify the symptoms of CVS: mild, moderate, severe, and no CVS. of which 34% are categorized as severe and 39% as mild to moderate (fig.2). Out of 144, 35 (24.3%) were using contact lenses. Of the 35 participants, 14 (40%) reported having severe symptoms of CVS, 12(34.3%) reported having mild to moderate symptoms and 9(25.7%) with no symptoms.

Fig-2 shows CVS categories based on scoring in the questionnaire.



105(72.9%) out of 144 subjects had one or more complaints suggestive of CVS. The most disturbing visual complaint was eyestrain (57.6%) followed by headache/neck pain (29.2%). Non ocular symptoms included backache/shoulder pain/wrist pain. (Table- 2).

Table 2: Distribution of visual complaints among Computer Users

S. No.	Symptoms	No. of Subjects	Percentage
1	Eye strain, Tired eyes, Sore eyes	83	57.6%
2	Watering, Irritation, Burning & Red eyes	30	20.8%
3	Blurred vision, Slowness of focus change	18	12.5%
4	Double vision	2	1.4%
5	Headache/ Neck pain	42	29.2%
6	Changes in colour perception	3	2.1%
7	Backache/ Shoulder pain/ Wrist pain	34	23.6%

The difference in the prevalence rate of computer-related problems in various studies depend upon various ergonomic factors. Present study had no statistical significance with the ergonomic factors with the occurrence of symptoms of computer vision syndrome (Table-3).

Table 3: Association of various ergonomic factors with the occurrence of CVS

Factor	Response	CVS present (n=105)	CVS absent (n=39)	p-value
Brightness of the room	Adequate	95 (90.5%)	35 (89.7%)	0.431
Adjustable chair height	Yes	73 (69.5%)	28 (71.8%)	0.409
Armrests at the level of desk	Yes	77 (73.3%)	30 (76.9%)	0.384
Position of hard copy device (printer/scanner)	Below the level of screen	57 (54.3%)	23 (59%)	0.723
Anti-glare monitor	Yes	35 (33.3%)	13 (33.3%)	0.542
Level of top of display screen	Equal to eye level	63 (60%)	26 (66.7%)	0.072

Use of screens in the darkroom:

75 (52.1%) of the 144 study participants were using their electronics in the darkroom. 32 (42.7%) of the 75 research participants had severe CVS symptoms, 25 (33.3%) had mild-moderate CVS symptoms, and 18 (24%), had no CVS symptoms.

4. Discussion

The majority of study subjects (62.5%) were male, and the mean age of the study group was found to be 20.93 ± 6.21 years. The results aligned with a study carried out among students at Saudi Arabia University, where the average age was 21.4 ± 1.9 years and 77.28% of the participants were male.^[8]

The prevalence of computer vision syndrome in our study was 72.9%. The findings were consistent with those of Lograj M et al., Talwar et al., and Iwakiri et al., who reported 80.3%, 76%, and 72.1% of the total, respectively.^[9] In our study, the majority of individuals (69.4%) belonged to the 22-30 age group. In their study, Talwar et al. discovered that 58.5% of the participants were between the ages of 20 and 29.8.^[10]

The most common symptoms of computer vision syndrome were eye strain, tired eyes, and sore eyes (57.6%); headache/neck discomfort came in second with about 29.2% of cases. 20.8% of students reported having watery, irritated, burning, or red eyes, while over 23.6% reported having back, shoulder, or wrist pain. 12.5% reported having trouble focusing and changing concentration quickly. 3.5% of those who remained complained of color shifts and double vision. The results of the current study were comparable to those of a study by Talwar et al. in which the study group experienced 76% of visual problems; the most common symptoms were watering of the eyes (23.2%), eye pain (25.7%), irritation in the eyes (18.6%), burning or itching (29.8%), redness (40.7%), headache (29.2%), and blurring of vision (13.2%).^[10]

The results of the study were endorsed by Jack R et al, who carried out a study on vision and work. Without taking any precautions, extended computer use was determined to be the primary cause of Computer Vision Syndrome.^[11]

5. Conclusion

In conclusion, due to the nature of their jobs, men were primarily impacted in our study. The core group of people who have symptoms of CVS is those in the age range of 26 to 30. Even though the sample size in our study was limited, the results ultimately indicated that most computer users had Computer Vision Syndrome. Modern life is impossible without computers. Their use has grown exponentially, ushering in a new era of occupational risk known as computer vision syndrome. Emphasizing good computer ergonomics can significantly lessen the stress of visual issues. The first step in prevention is to raise awareness and educate people about their health, including members of the public, healthcare workers, policymakers, and business owners. efficient administration. Users of computers can perform better at work and experience less computer-related morbidity with the right information, workstation configuration, and follow-up visits with physicians and ophthalmologists.

6. Recommendations

According to the current study, professional college students who use computers frequently experience health issues related to their vision. The results of this study supported the need of teaching new computer users about proper posture, eye workouts, and ergonomics. Since most higher education institutions now require students to use computers, the topic of preventing CVS and the discomfort it causes ought to be covered in the curriculum.

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