

Original research article

To determine the prevalence of computer vision syndrome among computer users: a descriptive study

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Abstract

Background: Computer vision syndrome is a complex of eye and vision problems related to near work which are experienced due to prolonged computer use. Computers demand near work, for longer duration which increases discomfort of eye and prolonged exposure to the discomfort leads to a cascade of symptoms that can be referred as computer vision syndrome.

Aim: The study to determine the prevalence of computer vision syndrome among computer users of Bihar state.

Material and methods: This was a Descriptive, Cross-sectional, non-randomized, questionnaire based study conducted in the Department of Ophthalmology, Patna Medical College and Hospital, Patna, Bihar, India, for 1 year. 100 individuals of both gender, who were asked to fill a set of questionnaire to get their personal information including demographic data (age, gender, occupation) and information regarding computer usage and individuals within age group of 20-60 years, spending 4 hours or more in front of a visual display terminal and not known to be suffering from any ocular disorder such as chronic ocular allergy, conjunctivitis, glaucoma, etc other than refractive errors were included in this study.

Results: All the 100 individuals fulfilling the inclusion criteria responded to the questionnaire completely. The mean age of the participants was 24.74 years (20-60 years) among whom females (57%) were more than males (43%). The prevalence of computer vision syndrome was found to be 69%. About 30 (30%) individuals used computer around 4 - 6 hours per day. The most disturbing symptom was eyestrain and fatigue in 59 (59%), headache 57 (57%), pain in neck, shoulder, wrist or back in 51(51%), dryness of eyes in 37 (37%) & blurred vision in 35 (35%) individuals. 11 participants (11%) were aware of CVS. 79 participants (79%) took preventing measures and the most common preventive measure was taking breaks in between work. In the present study 46(46%) participants took breaks as preventive measure after 1 hr and 25 (25%) after 20 minutes.

Conclusion: we concluded that the only 11 participants (11%) were aware of CVS. Some of the strategies found beneficial in reducing the symptoms are keeping the computer screen away which reduces eye strain, taking regular small breaks, maintaining good sitting posture to avoid neck pain and back pain, correction of visual problems and optimum room lighting.

Keywords: Computer vision syndrome

Introduction

“Computer Vision Syndrome” (CVS), is defined by the American Optometric Association as a complex of eye and vision problems related to the activities which stress the near vision and which are experienced in relation to or during the use of computers.¹ It is usually due to focusing of eyes on a computer or other display device for protracted, uninterrupted periods

of time and the eye muscles being unable to recover from the strain due to lack of adequate sleep. Symptoms of CVS include headache, blurred vision, eye fatigue, strain to eye, neck pain, dry eyes, diplopia, polyopia, difficulty in refocusing the eyes.² It is reported that around 60 million people suffer from CVS globally, and that a million new cases occur each year.³ CVS affects 75% of the people who work on computers, most markedly among those who work for more than 3 to 4 hours on computers. This includes all professions that use computers (Information Technology, Business Process Outsourcing, Accounting, banking, front office) students and children who

Work at the computer for more than 3 hours a day

- Have strain at computer work.
- Experience any or all of the symptoms of CVS stated
- Experience stressful situations associated with work

Due to advancement in technology, computer based learning is now a days considered as better option and hence the children and students of any age have very gradually switched to using computers, laptops, mobiles and tablets for both education and entertainment. This paradigm change has penetrated in youth as well as most of the education, entertainment and business-related activity are based on the use of computers.⁴ Most of the literature related to computer vision syndrome is on software professionals and IT professionals as these are the people who use computers for long time. This study was undertaken to assess the prevalence of computer vision syndrome among engineering students who are the predecessors of this profession. There has been a significant increase in the use of electronic gadgets like computers, laptops, mobile phones, tablets etc. which demands long continued hours of staring at screens thus affecting the vision and development of computer vision syndrome. CVS can be almost eliminated by taking a few simple, inexpensive precautions. With a large number of students using computers daily and the number growing each day, such preventive steps are the need of hour.⁵ The aim of the present study determine the prevalence of computer vision syndrome among computer users of bihar state.

Material and methods

This was a descriptive, cross sectional, non- randomized, questionnaire based study conducted in the department of Department of ophthalmology, Patna medical college and Hospital, Patna, Bihar, India, for 1 year, after taking the approval of the protocol review committee and institutional ethics committee.

Methodology

100 individuals of both gender, who were asked to fill a set of questionnaire to get their personal information including demographic data (age, gender, occupation) and information regarding computer usage and individuals within age group of 20-60 years, spending 4 hours or more in front of a visual display terminal and not known to be suffering from any ocular disorder such as chronic ocular allergy, conjunctivitis, glaucoma, etc other than refractive errors were included in this study. Individuals with an isometropia, amblyopia, tropia, myopic surgery, Keratoconus, allergic conjunctivitis, pterygium, uveitis, cataract surgery and glaucoma were excluded in this study.

Data were collected by validated questionnaires focusing on the patient demographic parameters frequency of occurrence of the symptoms (number of episodes per week), intensity of 12 symptoms (burning, eye pain, headache, eye redness, photophobia, tearing, repeated blinking, heavy eyelids, itching, blurred vision at distance and near, and double vision) & workers were then classified as asymptomatic, mild or intense symptomatology according to the score obtained on the questionnaire, yielding a CVS prevalence.

Results

All the 100 individuals fulfilling the inclusion criteria responded to the questionnaire completely. The mean age of the participants was 24.74 years (20-60 years) among whom females (57%) were more than males (43%). [Table 1 & 2]

The prevalence of computer vision syndrome was found to be 69%. About 30 (30%) individuals used computer around 4 - 6 hours per day. [Table 3]

The most disturbing symptom was eyestrain and fatigue in 59 (59%), headache 57 (57%), pain in neck, shoulder, wrist or back in 51(51%), dryness of eyes in 37 (37%) & blurred vision in 35 (35%) individuals.(table 3). 11 participants (11%) were aware of CVS. 79 participants (79%) took preventing measures and the most common preventive measure was taking breaks in between work. In the present study 46(46%) participants took breaks as preventive measure after 1 hr and 25 (25%) after 20 minutes.

Table 1: Age distribution of patients

Age	Number =100	Percent	Mean	SD
Below 20 years	30	30	24.74	5.98
20 to 30 years	60	60		
30 to 40 years	6	6		
40 to 50 years	3	3		
Above 50 years	1	1		

Table 2: Sex distribution of patients

Sex	Number =100	Percent
Male	57	57
Female	43	43
Total	100	100

Table 3: Disturbing symptoms

Disturbing symptoms	Number =100	Percent
Eye strain & fatigue	59	59
Headache	57	57
Dryness	37	37
Blured vision	35	35
Burning	33	33
Excessive blinking	31	31
Transient diplopia	22	22
Intermittent squinting	18	18

Table 4: Time spent on computer

Factors	Symptoms of CVS	Percentage
Duration of computer use per day		
< 2 hrs	55	55
2 – 4 hrs	32	32
> 4 hrs	13	13
Mobile Use per day		
< 2 hrs	22	22
2 – 4 hrs	30	30
> 4 hrs	48	48

Taking breaks in-between work		
Every 20 min	25	25
Every 50 min	1	1
Every 60 min	46	46
Every 2 hour	3	3
More than every 2 hours	6	6
No	19	19

Discussion

In the study the mean age of the participants was 24.74 years (20-60 years) among whom females (57%) were predominant than males (43%).

In our study the prevalence of symptoms of CVS was observed to be 69% which was comparable to a study by Seshadhri et al.⁶ and lesser than other studies which showed 89%⁷ and 80.3%.⁸ The most common symptoms in our study was eyestrain and fatigue in 59 (59%), headache 57 (57%), pain in neck, shoulder, wrist or back in 51(51%), dryness of eyes in 37 (37%) & blurred vision in 35 (35%) individuals. Blurred vision (42.4%), headache (23.0%) and redness (23.0%) were the most experienced symptoms by Natnael et al.⁹ Blurred vision, eyestrain, and eye irritation were the commonest reported symptoms of CVS with proportion of 62.60%, 47.63%, and 47.40%, respectively by Awrajaw and his colleagues.¹⁰ The most common complaint reported by P. Ranasinghe et al was headache (45.7%), followed by dry eyes (31.1%), whereas the least common complaint was changes in visualizing colours (9.3%).¹¹ Eye fatigue and discomfort due to constant focusing and refocusing of the eye when a person stares at a computer screen for long hours. Inappropriate sitting position also gives discomfort and stress to the eye, which leads the eye to be more focused and causes the eye muscles more spastic and experience symptoms of CVS. Symptoms were less when the viewing angle is less than 15° whereas more severe symptoms were observed in improper viewing angle above 15°. Higher viewing angles expose a greater area of conjunctiva and cornea to air and increase the chances of dryness and irritation.

Various studies have revealed that risk factor to the development of CVS was wearing corrective spectacles for refractive errors because the letters on the monitor are in the form of tiny dots called pixels which causes the eyes to accommodate more so as to focus a much clearer image.¹²⁻¹⁴ It is believed that spectacles prescribed by professionals with adequate anti-glare or anti- reflection protective surface might decrease these symptoms of CVS.

Duration of computer usage also significantly predicted the risk of CVS. Evidence from many other studies supports these findings.^{15,16} Rahman and Sanip reported in their study revealed that working on computer for more than 7 hr per day was a significant predictor for CVS.¹⁷ However, in our study 30 (30%) individuals used computer around 4-6 hours per day. and 48 participants had agreed to have been using mobile phone for more than 4 hours. The symptoms of headache, eye strain, dryness, burning, grittiness, heaviness or watering, stiff shoulders, low back pain and general fatigue were reported higher with increasing duration of daily computer use.

Those working on computer for more than 20 minutes without break were nearly 2 times more likely to suffer from CVS as compared to those taking break within 20 minutes.¹⁷⁻²⁰ In the present study 46(46%) participants took breaks as preventive measure after 1 hr and 25 (25%) after 20 minutes. Taking breaks in-between work, looking at far objects in-between work, massaging the eyes and washing the eyes with water were some of the preventive measures employed. Many of the visual symptoms experienced by the participants reduced after stopping computer work.

Conclusion

We concluded that the only 11 participants (11%) were aware of CVS. Some of the strategies found beneficial in reducing the symptoms are keeping the computer screen away which reduces eye strain, taking regular small breaks, maintaining good sitting posture to avoid neck pain and back pain, correction of visual problems and optimum room lighting.

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