A Study of Computer Vision Syndrome at the Workplace - Prevalence and Causative Factors

Soumya Harapanahalli Venkatesh[1], Anita T Girish[1], Shashikala[2], Praveen Kulkarni[3], Snigdha Mannava[4], Rajendra Rajarathnam[5]

ABSTRACT

Introduction: Computers are an essential part of our everyday life. More and more people are experiencing ocular and extra-ocular symptoms related to computer use – eyestrain, headache, blurred vision, dry eyes, neck/back ache – collectively known as Computer Vision Syndrome which is a widely spreading and largely unknown occupational hazard. Study aimed to determine the prevalence of symptoms, knowledge and practice of computer use in software professionals and to evaluate the association of various ergonomic factors with the occurrence of Computer Vision Syndrome.

Material and methods: Cross sectional study was conducted among the software professionals of a multinational company. Informed consent was obtained from the study subjects after inclusion criteria were met. Data was collected using a self-administered pre tested questionnaire. Data was analysed using SPSS version 22 program.

Results: The prevalence of vision related problems were reported by 83.5% of subjects in our study. Association of duration of computer use and visual symptoms was noted. Only 38.8% of them were aware of Computer Vision Syndrome. Symptoms were more in people who did not use anti-glare glasses.

Conclusions: Visual problems constitute an important part of computer vision syndrome. This warrants vigilance in identifying and effectively treating this condition. The study has also thrown light on various ergonomic factors contributing to its occurrence. Effective management requires a multidirectional approach combining health education, modification of ergonomics and appropriate ocular therapy.

Keywords: Asthenopia, Computer vision syndrome, Ergonomics, Health education, Software professionals

INTRODUCTION

Computer use has become a part and parcel of everyday life. This increase in the use of computers has led to a rise in the number of people with ocular complaints which are being grouped together as computer vision syndrome (CVS). 'Computer Vision Syndrome' 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] Blehm et al have divided the symptoms of CVS broadly into four categories- 1) asthenopic – eye strain, tired eyes and sore eyes 2) ocular surface related- watering, irritation and dry eye (Burning and red eyes) 3) visual- blurred vision, slowness of focus change, double vision and changes in color perception 4) extraocular- neck pain, backache and shoulder pain.[2] Prolonged work on computers may lead to diminished power of accommodation, removal of near point of convergence and deviation of phoria for near.[3] Non-ocular symptoms can occur due to improper working conditions and poor work habits. Vision-related problems are the most frequently reported health-related problems, occurring in over 70% of computer workers.[4] It is estimated that nearly 60 million people suffer from CVS globally, and that a million new cases occur each year.[4] Since personal computers are one of the commonest office tools used extensively, CVS will continue to cause significant and growing contribution to diminished productivity at work while also reducing the quality of life of a computer worker.

Many studies have been conducted in an attempt to address questions concerning safety and health for visual display terminal (VDT) users.

Reddy SC et al in 2013 studied the knowledge and practices of computer usage in university students in Malaysia.[5] Srivastava SR and Bobhate PS in 2012 analysed computer related health problems among software professionals in Mumbai, India.[4] Akinbinu and Mashalla assessed the knowledge of computer vision syndrome among computer users in Nigeria.[1]

This study aimed at determining the prevalence of CVS symptoms in software professionals, to assess the knowledge and practices of computer use in relation to CVS. The study also looked into the association between various ergonomic factors and occurrence of CVS.

MATERIAL AND METHODS

Study design and setting

A cross sectional study was carried out among the software professionals of a multinational software company at Mysuru, Karnataka in July 2014. Prior permission was obtained from the concerned authorities. Approval was obtained from the institutional ethics committee for conducting the study. Prior informed consent was obtained from the participants of the study.

Methods of measurement

A research questionnaire was prepared after reviewing the articles available on computer vision syndrome. The questionnaire included demography details, knowledge about CVS, spectacle use, symptomatology, work practices, ergonomics

[1]Assistant Professor, [4]Intern, [5]Professor, Department of Ophthalmology, [3]Assistant Professor, Department of Community Medicine, JSS Medical College and Hospital, JSS University, [2]Faculty, Department of Community Medicine, Mysore Medical College and Research Institute, Mysore, Karnataka, India

Corresponding author: Soumya Harapanahalli Venkatesh, 1498/6A, 'Geeta', Ram Iyyer Road, Krishnamurthypuram, Mysore- 570004, Karnataka, India

and preventive measures taken. A pilot study was conducted and the questionnaire was edited for easy understanding by the subjects. Simple random sampling technique was used for subject selection.

Study included subjects who used computers since past 6 months and working on them for at least 3 hours/day in this study. Those who did not consent for the study were excluded.

STATISTICAL ANALYSIS

Data entry and statistical analysis were done using SPSS version 22 program with the help of descriptive statistics like mean and percentages. Chi square test was used for comparison and calculating the p value.

RESULTS

291 participants were included in this study. Out of them 182 (62.5%) were males and 109 (37.5%) were females. Table-1 shows the presence of symptoms of CVS according to gender. Females had more disturbing symptoms than males. The mean age of the study subjects was 26.6 (6.3) years with the majority of population between 25-29. Among all study participants, the eldest person was 49 years. Male to female ratio was 1.6:1. 243 (83.5%) out of 291 subjects had one or more complaints suggestive of CVS. 79.5% (116) subjects complained of symptoms suggestive of CVS were in the 25-29 year age group. The most disturbing symptom was eye strain (53.9%). 37.8% of the study participants had been prescribed spectacles for distant vision, near vision or both.28.4% of the subjects who did not use the prescribed spectacles regularly complained of CVS symptoms. 81.4% of subjects who had CVS symptoms did not use anti-glare coated glasses during computer use (*P*-0.05). Only 27.5 % (*P*-0.01) consulted an ophthalmologist for their symptoms. The most disturbing visual complaint was eyestrain

	CVS (N= 243)	No CVS(N=48)	Total
Males	145(79.6%)	37(20.3%)	182
Females	98(89.9%)	11(10%)	109
Table-1: Gender and computer vision syndrome			

Sl no	Symptoms	No of subjects	Percentage
1	Eye strain	157	53.9%
2	Headache	112	38.5%
3	Neck/shoulder/wrist ache	90	30.9%
4	Backache	83	28.5%
5	Dry/irritated eyes	66	22.7%
Table-2: Distribution of visual complaints among software professionals			

(53.9%) followed by headache. Non ocular symptoms included neckache and backache (Table-2).

51.2% of the participants practiced one or more of the following measures during computer use: Taking regular breaks, looking at far-off objects in between work and use of eye drops.

DISCUSSION

This study aimed at estimating the prevalence of CVS symptoms and studying the association of various ergonomic factors in relation to CVS among software professionals in a multinational company at Mysuru, Karnataka.

The prevalence of Computer Vision Syndrome in our study was 83.5% (243/291). The observation was on par with the results obtained by Lograj M et al, Talwar et al and Iwakiri et al who reported 80.3%, 76% and 72.1% respectively.[7,8]

Majority of the subjects (79.5% /116) were in the 25-29 year age group in our study. Talwar et al in their study found 58.5% of subjects being in the age group of 20-29 years.[8]

We found that females had more CVS symptoms than males which was similar to shantakumari et al who also reported higher symptoms in females.[6]

The difference in the prevalence rate of computer-related problems in various studies depend upon factors like knowledge and awareness levels, workstation set up, degree of immobilization and levels of constrained postures, and practices of workers regarding computer ergonomics.[4] Present study had statistical significance with few of the ergonomic factors with the occurrence of symptoms of computer vision syndrome (Table-3).

38.8% of study population were aware of CVS. Thus the knowledge of study subjects were assessed. Majority of the symptoms were in the 4-8 hour group. Association between hours of computer viewing and presence of CVS symptoms (P-0.08) was observed (Figure-1).

The most disturbing symptom in our study was eye strain (53.9%) followed by headache (38.5%) similar to Shantakumari et al who also reported eye soreness (53.3%) as the common symptom.[6] Akinbinu and Mashalla also found eyestrain (30.9%) and headache (30.9%) as most disturbing complaint.[1]

Visual problems were found to be directly related to average computer hours per day. Our study found that majority of symptoms were in people who used computers 4-8 hours /day (36.8%) followed by subjects who used more than 8 hours/day (31.9%). The reduced number of symptoms in subjects using computers for more than 8 hours/day could be explained by some form of alternate mechanisms to prolonged exposure that happens resulting in reduced sensitivity and less response of the employee.[1] Lograj et al in their study also did not find

Factor	Response	CVS present n=243	CVS absent n=48	P value
Brightness of the room	Medium	194(82.2%)	42(87.5%)	0.391
Position of AC	Overhead	142(58.4%)	33(68.8%)	0.243
Adjustable chair height	Yes	188(77.4%)	38(79.2%)	0.784
Armrests at the level of desk	Yes	133(54.7%)	77(35.4%)	0.134
Position of hard copy	Below the screen	127(52.3%)	27(56.2%)	0.613
Viewing distance	25-30 inches	114(46.9%)	20(41.7%)	0.796
Anti-glare filter	Yes	74(30.4%)	21(43.7%)	0.07
Level of top of display screen	Equal to eye level	134(55.1%)	30(62.5%)	0.261
Table-3: Association of various ergonomic factors with the occurrence of CVS				

2376

International Journal of Contemporary Medical Research
Volume 3 | Issue 8 | August 2016 | ICV: 50.43 | ISSN (Online): 2393-915X; (Print): 2454-7379
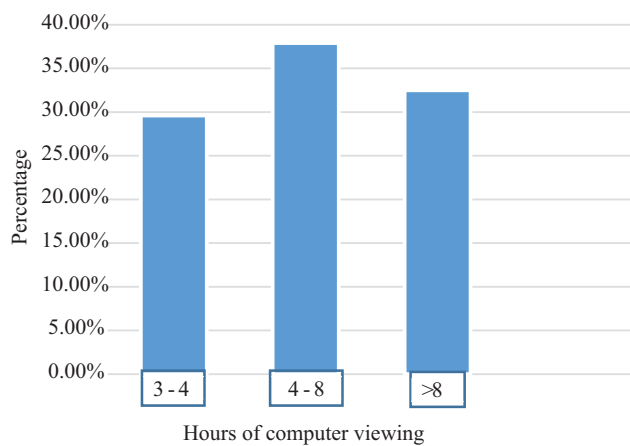
Figure-1: Distribution of subjects based on hours of computer viewing.

statistically significant difference for the symptoms of CVS between those who used computers for more than 6 hours and less than 4 hours.[4]

37.8% of the study participants had been prescribed spectacles for distant vision, near vision or both. Only 28.4% of the subjects who did not use the prescribed spectacles complained of CVS symptoms. The rest of the subjects used spectacles and also had CVS symptoms. This is similar to Reddy SC et al and Logaraj et al (72.2%) who found statistically significant difference.[5,7]

73.1% of subjects who had CVS symptoms did not use anti-glare screen during computer use (*P*-0.05) in our study. This is similar to Talwar et al who found 85.2% having symptoms did not use antiglare filters.[8]

The viewing distance from the display screen was less than 25 inches for 34.7% of the participants. This is in concordance with Stella C et al where 26.2% subjects had a viewing distance less than 25 inches.[9]

178 (80.5%) out of 243 who had CVS symptoms did not use the prescribed medication regularly. (*P*- 0.02).Thus the practice of the subjects in preventing CVS were assessed.

However, our study did not find significant association between some of the ergonomic factors and CVS. The limitations of our study were small sample size, questionnaire based recording of symptoms which were assumed to be entirely due to computer use.

CONCLUSION

Computers are an essential part of modern life. The exponential increase in their use have ushered in a new era of occupational hazard collectively known as computer vision syndrome. A variety of ergonomic factors like level of top of display screen, viewing distance from the screen, position of AC, brightness of the room, use of anti-glare filters, regular breaks, etc. play an important role in the development of this syndrome. Emphasis on proper computer ergonomics can go a long way in reducing the burden of visual problems. Despite its wide prevalence, CVS remains an underestimated and poorly defined issue at the workplace. Primary prevention lies in creating awareness and providing health education to the general public, health professionals, the government and private industries. Effective management of CVS requires a multidirectional approach combining health education, modification of ergonomics and

appropriate ocular therapy.

REFERENCES

1. Akinbinu TR, Mashalla YJ. Knowledge of computer vision syndrome among computer users in the workplace in Abuja, Nigeria. Journal of Physiology and Pathophysiology. 2013;4:58-63.
2. Blehm C, Vishnu S, Khattak A, Mitra S, Yee RW. Computer vision syndrome: a review. Survey of ophthalmology. 2005;50:253-62.
3. Bali J, Navin N, Thakur BR. Computer vision syndrome: A study of the knowledge, attitudes and practices in Indian Ophthalmologists. Indian journal of ophthalmology. 2007;55:289.
4. Shrivastava SR, Bobhate PS. Computer related health problems among software professionals in Mumbai: A cross-sectional study. International Journal of Health and Allied Sciences. 2012;1:74.
5. Reddy SC, Low CK, Lim YP, Low LL, Mardina F, Nursaleha MP. Computer vision syndrome: a study of knowledge and practices in university students. Nepalese Journal of Ophthalmology. 2013;5:161-8.
6. Shantakumari N, Eldeeb R, Sreedharan J, Gopal K. Computer Use and Vision. Related Problems Among University Students In Ajman, United Arab Emirate. Annals of medical and health sciences research. 2014;4:258-63.
7. Logaraj M, Madhupriya V, Hegde SK. Computer vision syndrome and associated factors among medical and engineering students in Chennai. Annals of medical and health sciences research. 2014;4:179-85.
8. Talwar R, Kapoor R, Puri K, Bansal K, Singh S. A study of visual and musculoskeletal health disorders among computer professionals in NCR Delhi. Indian journal of community medicine. 2009;34:326.
9. Chiemeke SC, Akhahowa AE, Ajayi OB. Evaluation of Vision-Related Problems amongst Computer Users: A Case Study of University of Benin, Nigeria. In World Congress on Engineering. 2007;1:2-6.

International Journal of Contemporary Medical Research
ISSN (Online): 2393-915X; (Print): 2454-7379 | ICV: 50.43 | Volume 3 | Issue 8 | August 2016

2377