

Original Research Article

Evaluation of visual problems among women IT employees in Chennai

Sivapriya K. R. S.^{1*}, Pankaj B. Shah², Sathiyasekaran B. W. C.²

Department of Community Medicine, ¹Tagore Medical College, ²Sri Ramachandra Medical College and Research Institute, Chennai, Tamil Nadu, India

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*Correspondence:

Dr. Sivapriya K. R. S.,

E-mail: sivapy18@gmail.com

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ABSTRACT

Background: In modern era of civilization, computers have become integral part of day to day life. Software professionals who work on computers for long hours in a day are prone for various health hazards, of which vision is of primary importance. This study was carried out to assess the burden of visual problems among women IT professionals.

Methods: A cross sectional study was carried out among 609 women IT professionals working in an IT company in Chennai. Women with over one year of work experience with computers were included. Symptoms of vision problems were elicited. Visual acuity was measured using Snellen's chart. Colour vision was evaluated using Ishihara Chart.

Results: Computer vision syndrome was present in 62.6% of the study participants. Blurring of vision was present in 26.6% and irritation in the eyes was present in 25.3%. Prolonged duration of work was significantly associated with visual problems ($p < 0.05$).

Conclusions: Unavoidable exposure to computer at workplace needs to be managed effectively by way of implementing preventive and rehabilitative measures at individual and organizational level.

Keywords: Asthenopia, Blurring of vision, Computer vision syndrome, IT professionals

INTRODUCTION

Since the past few decades, computers have transformed from being a luxury to an essential commodity. It has become inevitable for most of the industries, banking sectors, colleges, hospitals and other business sectors. The infiltration of computers into all sectors of industry and commerce has led to a manifold increase in the need for developing software for these industries. This has indirectly led to the increase in the recruitment of qualified and skilled workers in the field of information and technology (IT).

The IT boom in India occurred two decades ago. With the growing demand for software, India emerged as a top software exporter, becoming one of the largest service

traders in the world.¹ It has been estimated that around one million computer professionals graduate every year.²

With the increase in the number of users, there has been a steady increase in the duration and intensity of computer use. This has led to several health problems, including musculoskeletal, visual, psychological and physiological problems. Among the various health hazards of computer use, visual problems are more damaging, because of the fact that they are direct, and cannot be compensated. The visual problems of the computer users are collectively termed as computer vision syndrome, which has been defined by the American Optometric Association 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'.³ These symptoms

often include blurring of vision, dry eyes, burning sensation, redness and headache.⁴

In the cross sectional study of IT professionals in the National Capital Region, Delhi, the computer related morbidity was present in 93% and the prevalence of visual problems was 76%.⁵ A study done by Logaraj et al showed a prevalence of 80.3% for CVS in Chennai in 2014.⁶ A study done by Arumugam et al also reported a prevalence of 69.3% in Chennai among IT professionals.⁷

Considering the magnitude of the problem, there are few studies which have focused exclusively on the prevalence among women in the industry. Women, by their physiological nature, are vulnerable to several problems, and visual problems add extra morbidity to their health status. A thorough knowledge on the burden of the visual problems among women IT professionals will help in developing an exclusive rehabilitative program, to prevent complications among women.

Objectives

- To estimate the prevalence of computer vision syndrome among women IT professionals.
- To evaluate the risk factors for computer vision syndrome among women IT professionals.

METHODS

Study setting

This study was carried out as a cross sectional study in an IT company in Chennai between September 2014 to October 2015.

Study population

The study population comprised of women IT professionals working in IT companies. Based on the literature review, the prevalence of computer vision syndrome was found to be 76% in the Delhi NCR.⁵ At 95% level of significance and 5% relative precision, the sample size was calculated as 485. Allowing 10% for refusals, the final sample size was calculated as 533.5 and was rounded off to 600.

Permission was granted for the study in one IT company, in Chennai, which housed 22 projects. Four projects had women's population above 1000. Out of these four projects, one project with a population of 703 was selected at random. All the participants who consented for the study in this project were included in the study. A total of 609 women participated in the study.

Selection criteria

Women with over one year of experience in working with computers were included. Pregnant and lactating mothers were excluded from the study.

Ethical approval and informed consent

Approval from Institutional Ethics Committee and from the head of the IT company was obtained prior to the data collection. Each participant was explained in detail about the study and informed consent obtained from them prior to the data collection.

Data collection

A structured interview schedule was used to collect information regarding the participants' background details, work related information and symptoms pertaining to eye problems. Visual acuity was tested using Snellen's chart and colour vision was assessed using Ishihara chart.

Operational definitions

1. *Asthenopia*: It is considered when the symptoms reported during or after working with computers. When the subject is diagnosed to have asthenopia, needs further ophthalmic evaluation.⁸
2. *Visual acuity*: The acuity of vision was tested using Snellen's chart. Subjects were asked to read letters on distance of 20 feet, 20/20 (or 6/6) vision is a term used to express normal visual acuity. 20/20 vision only indicates the sharpness or clarity of vision at a distance. Snellen's test type for reading or printer's type (N series) at a distance of about 25cm was used to record visual acuity for near vision.⁹
3. *Color vision*: It was tested using Ishihara color charts. It consists of a number of colored plates. The subjects were asked to look for numbers among the various colored dots holding the test plates approximately 20-30 in (50-75 cm) away, which help distinguish between red, green and blue color deficiencies. Individuals with normal color vision will see a number, while those with a deficiency do not see it. On some plates, a person with normal color vision may see one number, while a person with a deficiency sees a different number.⁹

Data analysis

Data was entered and analysed using SPSS ver 16 software. Percentages were computed for prevalence of CVS. Chi square test was used to assess the statistical significance between CVS and the risk factors.

RESULTS

This study was carried out among 609 women IT professionals working in a software company in Chennai. The mean age of the study participants was 24.9 years. The background information of the study participants is given in Table 1.

Table 1: Background characteristics of the study participants.

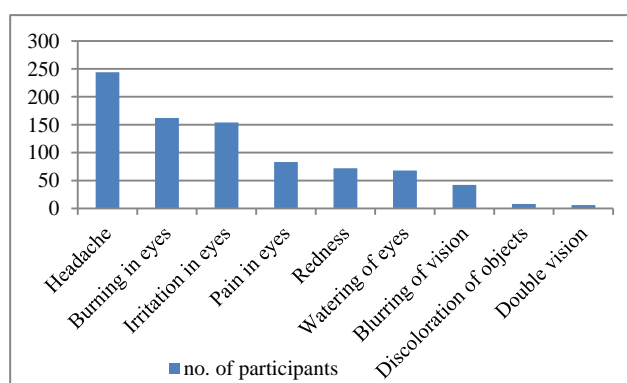
S. No	Background characteristics	No. of women (n=609)	Percentage (%)
1.	Age group (in years)		
	21-25	331	54.4
	25-29	239	39.2
	29 and above	39	6.4
2.	Educational qualification		
	Undergraduate	466	76.5
	Postgraduate	143	23.5
3.	Type of family		
	Nuclear	512	84.1
	Joint/others	97	15.9
4	Marital status		
	Single	464	76.2
	Married	145	23.8
	Separated/divorce/cohabiting/ widowhood	0	-

Table 2: Prevalence of visual problems among study participants.

S. No	Particulars	No. of women (n=609)	Prevalence (%)
1.	Visual acuity		
	Normal	421	69.1
	Normal with glasses/contact lens	188	30.9
2.	Color blindness	0	0
3.	Spectacle use for		
	Refractive error	188	30.9
	Antiglare	36	5.9
4.	Contact lens use	14	2.3
5.	Asthenopia (any one symptom)*	381	62.6
	Overall prevalence of computer vision syndrome	381	62.6

Table 3: Association between visual problems and risk factors.

S.No	Particulars	Asthenopia n (%)	Chi-square value	P value	Odds ratio	Odds ratio CI	95%
1.	Role in project						
	Software developer (n=556)	363 (65.35)					
	Project leader (n=53)	18 (34)	20.27	<0.001	3.66	1.95-6.92	
2.	Working hours/day with computers in office						
	10 hrs & above (n=159)	110 (69.2)	-				
	<10 hrs (n=450)	271 (60.2)	4.03	0.044	1.48	0.99- 2.22	
3.	Working hours/day with computers in office with breaks						
	10 hrs & above (n=129)	94 (72.9)	-				
	<10 hrs (n=398)	247 (62.1)	4.98	0.025	1.64	1.04- 2.61	

**Figure 1: Prevalence of asthenopia among the study participants.**

The particulars related to the visual problems are given in Table 2. The prevalence of computer vision syndrome in the study population was 62.6%. The prevalence of asthenopia is given in Figure 1. Burning in eyes was present in 26.6% of the population, followed by irritation in eyes in 25.3%.

The association between visual problems and other risk factors is given in Table 3. It was observed that software developers and increased working hours were significant risk factors for visual problems ($p < 0.05$).

DISCUSSION

India, being a major service provider to IT industry, more than 2.5 million people are employed in this sector either directly or indirectly, making it one of the biggest job creators in India and a mainstay of the national economy.¹⁰ This has led to the new genre of occupational health problem i.e. computer related health problems. It was observed by other studies done among men and women IT professionals resulted with very high computer related morbidity.^{5,10}

In the current study, the prevalence of asthenopia was 62.6% among the study subjects. In a study done by Bhandari et al in Gujarat reported that 47.1% of female computer operators suffered from asthenopia.⁸ The prevalence was reported by Bhandari et al is low because

this study was conducted among bank employees, computer training centers and college students.⁸ A study conducted in Delhi by Talwar et al the prevalence of asthenopia reported was 76%.¹¹

In the present study, the more prevalent symptom of asthenopia was headache (40.1%) which is similar with the earlier study done in Ahmedabad by Bhatt et al.¹² The next common symptom reported in the present study was burning of eyes (26.6%) which were comparable with the study conducted in Delhi by Talwar et al.¹¹

In the current study, 30.9% were found to use spectacles for refractive error. Only 5.9% were using spectacles for the purpose of ant glare. Bhandari et al in Gujarat reported the prevalence of refractive error as 36% which was more than the present study.⁸

Prolonged use of computers exposes individuals to harmful light waves. This results in an imbalance of light between the computer screen and the surrounding environment. It also results in a glare, which impairs the reading. The need for adjusting the brightness and contrast is evidenced in this study.¹³

CONCLUSION

Computer vision syndrome is a significant risk factor which in the long run, debilitates the individual resulting in various co-morbidities. Though the problem cannot be avoided, the intensity of damage may be minimized by introducing effective preventive and rehabilitative measures like eye exercises, taking breaks in between works, etc. A periodical evaluation with an ophthalmologist may help in minimizing the impact of these problems on the health and wellbeing of the IT employees.

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Conflict of interest: None declared

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

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