

Cross-sectional study of computer vision syndrome among human resource professionals in tertiary care hospital

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Abstract

To detect the prevalence of computer vision syndrome among human resource professionals in tertiary care hospital. The dependence on the computer is rising with time. This will lead to numerous ill-effects in human beings out of which ocular manifestations play a prominent role. Previously done studies reveal that the awareness of ocular manifestation is less than 20%. Among the lesser known ocular manifestations, one of it is computer vision syndrome. This cross-sectional study included HR professionals of SRMS IMS, Questionnaire survey study data were collected in computer users regarding the demography, duration of computer use (hour per day), years of computer use, working distance from computer, level of top of screen from eye level, use of antiglare screen, brightness and contrast adjustment, taking breaks during computer use. During this study period, 60 patients were randomly selected from HR professionals. In which, 37 (62%) males and 23 (38%) females were participated. They were having ocular complaints in descending order such as eye strain (69%), headache (56%), dryness (49%), irritation (47%), burning sensation (41%), blurred vision (39%), itching (32%), watering (29%), redness (21%), and double vision (16%).

Key words : Computer vision syndrome, dry eye.

1. Introduction

Computer was invented by Charles Babbage in 1791, which was modified into a programmable computer by Manglebone in 1871.^[1] In India first computer was used in Indian Statistical Institute in Calcutta in 1956.^[1] INS survey was conducted in December 2013 which says total number of computer users in India was 150,000,000.^[2] We cannot think the modern world without computers. The dependence on the computer is rising with time. This will lead to numerous disorders in human beings out of which ocular manifestations play a prominent role. Healthy eyes can easily maintain focus on the printed page. Characters on a computer screen however don't have this contrast or well-defined edges. These characters (pixels) are brightest at the center and diminished in intensity towards their edges. This makes it very difficult for our eyes to maintain focus and remain fixed on these images. Instead, our eyes drift out to a point called the "resting point of accommodation" that is approximately 30" and grows as we get older. When the demand at near work exceeds the normal ability of the eye to perform the job comfortably, one develops discomfort and prolonged exposure to the discomfort lead to a cascade of reactions that can be put together as Computer Vision Syndrome. American Optometric Association defines Computer vision syndrome (CVS) as "the complex of eye and vision problems experienced during or related to computer use."^[3] National Institute of Occupational Safety and Health Survey has reported that visual symptoms occur in 75-90% as opposed to 22% musculoskeletal disorders of video display terminals (VDT) workers. CVS characterized by eye strain, eye tiredness, headache, blurred vision, dryness, irritation, redness, contact lens discomfort, neck shoulder, and back pain.^[4-6]

2. Materials and Methods

This cross-sectional was conducted in Department of Ophthalmology, Shri Ram Murti Smarak Institute of Medical Sciences Bareilly India during the period of January 2016 to August 2016. The study design was approved by the Human Ethical Committee of SRMS IMS. Patients are taken randomly from HR profession who are all attending ophthalmology outpatient department. Patients between age 20 and 50 years who are Computer users with complaints of eye strain, dry eye, blurred vision, redness, watering, headache neck and shoulder pain and have minimum 1 h exposure to any type of VDT such as desktop, laptop or both for at least 2 years are included in the study. Computer users of age <20, >50, contact lens users, those who are on treatment for thyroid disorders or Suffering from ocular inflammatory conditions like conjunctivitis, scleritis, uveitis, glaucoma, stye and blepharitis and Patients having any fundus pathology like optic atrophy, Diabetic retinopathy, Hypertensive retinopathy, papilledema are excluded from the study. Need for the study was explained to the patients, and their consent was obtained. Questionnaire survey study data was collected from patients regarding the demography, ocular complaints such as eyestrain, eye tiredness, headache, blurred vision, irritation, redness, duration of computer use (hour per day), years of computer use, their refractive status, whether they were using glasses or not, working distance from computer, level of top of screen from eye level, use of antiglare screen, brightness and contrast adjustment, taking breaks during computer use.

3. Results

During this study period, 60 patients were randomly selected from HR professionals who visited department of ophthalmology of SRMS IMS Bareilly. In which 37 (62%) males and 23 (38%) females were participated. They were having ocular complaints in descending order like eye strain (69%), headache (56%), dryness (49%), irritation (47%), burning sensation (41%), blurred vision (39%), itching (32%), watering (29%), redness (21%), and double vision (16%). Most of them were working computers 7-9 h/day, and most of the males were working 16-20 years and females were working 11-15 years in our study [Tables 1 and 2].

Table 1 : Duration of computer usage in males and females.

Duration of computer use (h/day)	Male (%)	Female (%)
Up to 3 h	1(42.)	1(58.)
4-6 h	8(67.)	4(33.)
7-9 h	18(62.)	12(38.)
10-12 h	10(60.)	6(40.)
P=0.054 significant		
Duration of computer use (years)		
Up to 5 years	12(61.)	8(39.)
6-10 years	14(66.)	7(34.)
11-15 years	7(55.)	6(45.)
16-20 years	4(66.)	2(34.)
P=0.041 significant		

Table 2 : The gender distribution based upon distance and level of the top of screen.

Duration of computer (inches)	Male (%)	Female (%)
10-15	8 (62.3)	6 (37.7)
16-20	12 (64.5)	6 (35.5)
21-25	14 (60)	9 (40)
26-30	3 (60.8)	2 (39.2)
P=0.028 significant		
Level of the top of screen		
Above the level of eyes	3 (69.5)	2 (30.5)
At the level of eyes	25 (57.6)	18 (42.4)
Below the level of eyes	9 (74.1)	3 (25.9)
P = 0.52 not significant		

Table 3 : The gender distribution based upon use of antiglare screen, brightness adjustment, taking breaks during computer use

Use of antiglare screen	Male (%)	Female (%)
Using screen	26 (43.3)	17 (29)
Not using screen	11 (56.7)	6 (71)
P=0.41 not significant		
Brightness adjustment		
Adjustment	30 (49)	14 (24)
No adjustment	7 (51)	9 (76)
P=0.34 not significant		
Breaks during computer use		
Took breaks	22 (37)	14 (24)
No breaks	15 (63)	9 (76)
P = 0.05 not significant		

Another study reported that the prevalence of the visual symptoms were significantly higher in the individuals who spent more than 4 h daily, working on VDT. The duration of the computer work was directly related to the eye symptoms, and that a longer duration tended to result in long-lasting complaints that persisted even after the VDT work was finished. Our study also revealed that the ocular complaints were reported more by the subjects who used computers for more than 6 h a day. Duration of computer use had significant relationship (P = 0.034). 36% males and 28% females were having refractive error that was corrected by spectacles [Tables 3]. Our study also found that the

ocular complaints were more frequent in the subjects who did not use glasses and redness had a significant association. Most of them 23 (38%) were working in 21-25 inches working distance and they (72%) have a level of the top of the screen at the same level of eyes. Antiglare computer screen was used by 43% males and 29% females. Only 24% females had knowledge about computer brightness and contrast adjustment in our study.

4. Discussion

The prevalence of computer vision syndrome in our study was 97.4% of which eye strain was 69% that was correlates with Bali et al.2007.^[7] The duration of computer use is directly related to eye symptoms, and longer duration tends to result in longlasting complaints even after the work was finished (Bergqvist and Knave, 1994; Sanchez-roman et al., 1996, Shimaet al., 1995). Stella et al., (2007) observed more pronounced visual symptoms in people spending 6-9 h daily at computer. A higher proportion of subjects who had their computer screen at or above the eye level reported more symptoms (Bhanderiet al., 2008; Jaschinskiet al., 1998; Bergqvist and Knave, 1994).^[8-10] Tear film maintains moisture and oxygen balance of cornea. Blink reflex facilitates resurfacing of the precorneal tear film. Normal blinking rate is 12-15 times/min. It is 60% less than normal people while working with computer.^[11] Other factors responsible for computer vision syndrome were poor workstation setup or improper use of work station, glare and reflections from the monitor and surroundings, uncorrected spectacle power Inappropriate glasses for computer use and Job nature and stress (Stella et al., 2007; Cole, 2003).^[12,13] Computer vision syndrome can be managed with work style modifications like chair adjustment - chairs with armrests, position of head slightly tilted downwards and the feet rest flat on the floor. Use suspended lights from ceiling and shade windows with curtains. Attach an antiglare screen in front of the monitor, minimize glare on computer by turning monitor away from the window and reducing strong overhead light, balancing overhead and window light with a desk lamp (Sheedy et al., 2005). Use screen mounted document holder at the same plane



of the computer. Ideal viewing area of the monitor is 6 inches, below the horizontal eye level. Monitor should be more than 25 inches straight from eyes. Work with fonts of darker shades on the lighter background.^[14] Avoid sitting in front of A.C or in a room with low humidity. Eye breaks during computer use by 20-20-20 rule as suggested. Take short breaks every 20 min for 20 s and look away 20 feet.^[4-6] Even people with normal vision would need glasses just for computer use. They allow eyes to focus more clearly and reduce strain from monitor use. +0.25 D power is usually added in the glass to move out eye's focal point closer without using accommodation. Bifocal, progressive lenses also can help in reducing CVS (Sheedy, 2000).

Preservative free Artificial tears eye drops form the mainstay of management of dry eyes in CVS.^[15]

References

- [1] Available from: <http://www.en Wikipedia.org/wiki/computer/page-112>.
- [2] Available from: <http://www.internetworld stats.com/asia/in.htm>.
- [3] Computer Vision Syndrome. American Optometric Association. Available from: <http://www.aoa.org/>.
- [4] Computer Vision Syndrome 2011. Available from: <http://www.eophtha.com>.
- [5] Adobe Acrobat. Computer Vision Syndrome; Manual Book; Latest Layout. Available from: <http://www.rajaneyecare.com/>.
- [6] Available from: <http://www.shankaraneth ralaya.com/patient care/cvc.html>.
- [7] J. Bali, N. Navin and B.R. Thakur. Computer vision syndrome: A study of the knowledge, attitudes and practices in Indian ophthalmologists. *Indian J Ophthalmol* 55, (2007) 28994.
- [8] N. Freudenthaler, H. Neuf, G. Kadner and T. Schlote. Characteristics of spontaneous eyeblink activity during video display terminal use in healthy volunteers. *Graefes Arch ClinExpOphthalmol*, 241, (2003) 914-20.
- [9] J. Bali, N. Navin and B.R. Thakur. Computer vision syndrome: A study of the knowledge, attitudes and practices in Indian ophthalmologists. *Indian J Ophthalmol*, 55, (2007) 289-94.
- [10] K. Raj. Computer vision syndrome: Recognition and control in software professionals. *J Hum Ecol*, 28, (2009) 67-9.
- [11] R. Keith. Survey reveals eye suffering among computer users. *Las Vegas Rev J*, 28, (2008) 34-45.
- [12] C. Kesavachandran, S.K. Rastogi, M. Das, A.M. Khan. Working conditions and health among employees at information technology enabled services: A review of current evidence. *Indian J of Med Sci* 60, (2006) 3007.
- [13] J.C. Izquierdo, M. García, C. Buxó and N.J. Izquierdo. Factors leading to the computer vision syndrome: An issue at the contemporary workplace. *BolAsoc Med PR*, 99, (2007) 21-8.
- [14] K.L. Griffiths, M.G. Mackey and B.J. Adamson. The impact of a computerized work environment on professional occupational groups and behavioural and physiological risk factors for musculoskeletal symptoms: A literature review. *J OccupRehabil*, 17, (2007) 743-65.
- [15] T. Schlote, G. Kadner and N. Freudenthaler. Marked reduction and distinct patterns of eye blinking in patients with moderately dry eyes during video display terminal use. *Graefes Arch ClinExpOphthalmol*, 242, (2004) 306-12.