Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 9, Issue, 07, pp.54731-54734, July, 2017

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

RESEARCH ARTICLE

COMPUTER VISION SYNDROME AMONG MEDICAL AND ENGINEERING PROFESSIONALS OF INDIA

***,[1]Rupsa Banerjee and [2]Bratati Banerjee**

[1]Department of Community Medicine, Vardhaman Mahavir Medical College & Safdarjang Hospital, New Delhi – 110029, India
[2]Department of Community Medicine, Maulana Azad Medical College, Bahadur Shah Zafar Marg, New Delhi – 110002, India

ARTICLE INFO

Article History:
Received 18th April, 2017
Received in revised form
20th May, 2017
Accepted 06th June, 2017
Published online 31st July, 2017

Key words:

Computer Vision Syndrome,
Musculoskeletal Symptoms,
Ocular Symptoms

ABSTRACT

Introduction: Computer Vision Syndrome (CVS) is a condition resulting from long hours of computer use, in which a person experiences one or more eye and/or musculoskeletal symptoms. A high prevalence of CVS has been seen worldwide including India. The present study was conducted to assess the prevalence of CVS among medical and engineering professionals and find out the factors related to computer use which may be associated with it.

Methods: A total of 108 medical and 100 engineering professionals were included in the study. Information regarding computer use and presence of symptoms suggestive of CS was obtained through administration of an online questionnaire.

Results: The prevalence of CVS was found to be 82.68% among the study participants. It was greater in engineering (92%) as compared to medical (74.07%) professionals, the difference being statistically significant ($p<0.05$). Presence of symptoms was significantly higher in those who used computer for 4 hours or more per day, among those who viewed the computer at a distance less than 15 inches and those who worked in the absence of overhead light at their work station.

Conclusion: CVS was found to be highly prevalent among both medical and engineering professionals in India.

Citation: Rupsa Banerjee and Bratati Banerjee, 2017. "Computer vision syndrome among medical and engineering professionals of India", *International Journal of Current Research*, 9, (07), 54731-54734.

INTRODUCTION

Use of computer has increased worldwide over the recent years. India is not an exception and it has seen rising trends of computer use among young and old alike. Increasing digitalization and technology has warranted need for computer use in the professional domain. There has been a sharp rise in work-related computer use among medical and engineering professionals in India, which also includes computer use for academic purposes by students such as projects, thesis-writing, presentations, as well as extra-curricular use like watching movies and internet surfing (Reddy *et al*., 2013). Excessive computer use results in ill health of various kinds, one of which is Computer Vision Syndrome (CVS). Computer Vision Syndrome is a condition resulting from longhours of computer use, in which a person experiences one or more eye and/or musculoskeletal symptoms (American Optometric Association, 2017). The symptoms occur due to strain or fatigue of the muscles of the eye which is followed by various eye symptoms like blurred vision, dry and red eyes, diplopia, eye irritation and headache. Prolonged working on a computer also entails sitting in the same posture usually during the entire period of computer use which often results in various musculoskeletal problems commonly neck pain and backache. Symptoms of Computer Vision Syndrome have been divided into four categories: (a) asthenopic symptoms viz. eye strain, tired eyes, sore eyes, (b) ocular surface related symptoms viz. watering of eyes, eye irritation, dry eyes, (c) visual symptoms viz. blurred vision, diplopia, and (d) extraocular symptoms viz. neck pain, backache, shoulder pain (Blehm *et al*., 2005). Previous studies have shown a high prevalence of Computer Vision Syndrome among computer users (Reddy *et al*., 2013; Logaraj *et al*., 2014; Talwar *et al*., 2009; Sharma *et al*., 2006; Charpe and Kaushik, 2009; Gupta *et al*., 2014). The resulting eye and musculoskeletal symptoms often deter work and reduce efficiency, which significantly hampers work output especially among those whose profession necessitates computer use. The present study was undertaken to assess the prevalence of Computer Vision Syndrome among medical and engineering professionals and find out the factors related to computer use which may be associated with Computer Vision syndromeso as to be able to advocate the reduction of the same.

******Corresponding author:* **Rupsa Banerjee,**
Department of Community Medicine, Vardhaman Mahavir Medical College & Safdarjang Hospital, New Delhi – 110029, India.

MATERIALS AND METHODS

The study was undertaken among medical and engineering professionals from various parts of India. It was a cross sectional study. An online survey was done using a pre-tested semi-structured self-administered questionnaire. Considering prevalence of Computer Vision Syndrome to be 80% in this group (Logaraj *et al*., 2014), the sample size was calculated as 100 at 95% confidence level and 10% relative error. An online survey portal was used to administer the questionnaire to the study subjects. Informed consent of the participants was included in the survey form. Snowball sampling method was followed. The questionnaire was sent to the contacts of the researchers in various institutions and firms. Equal representation for medical and engineering professionals was maintained. These subjects who returned the completely filled up questionnaire were in turn asked to circulate the questionnaire among their contacts in different institutions. A maximum of five subjects per institution or firm were included to prevent clustering of study subjects. The questionnaire included information on socio-demographic details, duration of computer use per day, type of computer, type of lighting, use of glasses or contact lenses, viewing distance of the computer from the eyes, apart from questions on presence of ocular and/or musculoskeletal symptoms of Computer Vision Syndrome. Only those subjects who had been using a computer for at least 5 years prior to the study i.e. during education and/or employment were included in the study. Informed consent was included in the questionnaire.

RESULTS

Sociodemographic variables A total of 108 medical and 100 engineering professionals aged 23-30 years returned the completely filled up questionnaire and hence were included in the study. Among the study subjects, 98 (47.11%) were males and 110 (52.89%) were females. The mean age of the medical professionals was 24.88+1.57 years whereas that of the engineering professionals was 25.16+1.49 years, thus indicating that the two groups were comparable. Among the medical professionals, 45 (41.67%) were males and 63 (58.33%) were females whereas among the engineering professionals, 53 (53%) were males and 47 (47%) were females.

Prevalence of CVS A total of 172 (82.69%) of the study subjects experienced one or more symptoms of Computer Vision Syndrome. The prevalence of Computer Vision Syndrome was 74.07% among medical professionals and 92% among engineering professionals. On statistical test, the difference was found to be strongly significant. ($p<0.001$) (Table 1)

Symptoms of CVS The commonest symptom reported among the study subjects was neck and/or shoulder pain (50.96%) followed by sore/tired eyes (44.71%), backache (31.73%), dry eyes (25%) and headache (22.60%). Among the medical professionals 43 (39.81%) reported neck and/or shoulder pain, 38 (35.18%) complained of sore/tired eyes, 35 (32.41%) had backache, 25 (23.15%) had itching/red eyes and 23 (21.30%) complained of headache. Among the engineering professionals, the most common symptoms were neck and/or shoulder pain (63%), sore/tired eyes (55%), dry eyes (34%), backache (31%) and blurred vision (27%) (Table 1)

Engineeringvs Medical professionals All the symptoms were more prevalent in engineering as compared to medical professionals except backache and itching/red eyes. Significantly higher prevalence were seen for neck/shoulder pain ($p<0.001$), sore/tired eyes ($p<0.05$), dry eyes ($p<0.05$) and blurred vision ($p<0.05$) among engineering professionals (Table 1).

Table 1. Distribution of study subjects according to symptoms of Computer Vision Syndrome

Parameters	Total* (n=208) N (%)	Medical professionals (n=108) N (%)	Engineering professionals (n=100) N (%)	P value
Any symptom of CVS present	172 (82.69)	80 (74.07)	92 (92.00)	p=0.00064
Neck/shoulder pain	106 (50.96)	43 (38.91)	63 (63.00)	p=0.00084
Sore/tired eyes	93 (44.71)	38 (35.18)	55 (55.00)	p=0.0041
Backache	66 (31.73)	35 (32.41)	31 (31.00)	p=0.82588
Dry eyes	52 (25.00)	18 (16.67)	34 (34.00)	p=0.00398
Headache	47 (22.60)	23 (21.30)	24 (24.00)	p=0.63836
Itching/red eyes	43 (20.67)	25 (23.15)	18 (18.00)	p=0.35758
Blurred vision	38 (18.30)	11 (10.19)	27 (27.00)	p=0.00168

*Multiple responses

Table 2. Association of Computer Vision Syndrome with factors related to computer use

Factors related to computer use	No symptoms of CVS	1-3 symptoms of CVS	≥4 symptoms of CVS
Hours of use			
<4 hours per day	69	62	6
(n=137)	5	43	23
≥4 hours per day	p=0.00	p=0.03662	p=0.00
(n=71)			
P value			
Distance of viewing computer screen	6	40	19
<15 inches (n=65)	31	83	29
≥15 inches (n=143)	p=0.00	p=0.02926	p=0.1556
P value			
Lighting at work station	29	58	34
Overhead light	10	56	21
(n=121)	p=0.0232	p=0.01878	p=0.52218
Diffuse light			
(n=87)			
P value			
Use of glasses/contact lens	19	76	39
Yes (n=134)	17	42	15
No (n=74)	p=0.1096	p=0.99202	p=0.16452
P value			

Hours of computer use A greater proportion of subjects (65.87%) reported less than 4 hours of computer use per day. Out of the study subjects who used the computer for less than 4 hours a day on an average, 50.36% did not experience any symptoms of Computer Vision Syndrome at all and41.67% reported only one symptom. On the other hand, among the study subjects who used the computer for 4 hours or more per day, 32.39% reported four or more symptoms while only 7.04% did not report any symptoms. In all, a greater proportion of subjects who used the computer for four hours or more in a day exhibited symptoms of Computer Vision Syndrome as compared to those with less than four hours of use per day and this difference was found to be statistically significant (Table 2).

Distance of viewing computer screen Majority of the subjects (68.75%) reported their viewing distance of the computer to be 15 inches or more. The distribution of symptoms of CVS among the study subjects with viewing distance of computer screen showed that a greater proportion of subjects who viewed the computer at a distance of 15 inches or more did not suffer from CVS as compared to those who viewed the computer at a distance of less than 15 inches. This difference was statistically significant. A significantly higher proportion of subjects with a viewing distance of less than 15 inches showed one or more symptoms of CVS (Table 2).

Lighting at workstation 58.17% of the study subjects reported to have an overhead lighting at their workstation. The subjects who had lighting above their workstation showed significantly lesser symptoms of CVS as compared to those who worked in diffuse lighting, and they were also significantly more symptom-free. Both these differences were statistically significant (Table 2)

Use of glasses/contact lenses A greater proportion of study subjects (64.42%) reported use of glasses and/or contact lenses while working. Although there was a greater prevalence of CVS symptoms among subjects who used glasses and/contact lenses, the difference was not statistically significant (Table 2)

Viewing level of computer screen A greater proportion of subjects who worked with the computer screen below the eye level had symptoms of Computer Vision Syndrome as compared to those whose computer screen was at or above the eye level. This finding was contrary to the fact that the computer screen should be below the eye level in order to prevent ocular symptoms.

DISCUSSION

The present study conducted among medical and engineering professionals of India showed the prevalence of symptoms of Computer Vision Syndrome to be 82.69%. Previous studies have reported similar findings with regard to prevalence of CVS: Reddy *et al*, 2013 in Malaysia (89.9%), Logaraj *et al*, 2014 in Chennai (80.3%), Talwar *et al*, 2009 in Delhi (76%), Charpe *et al*, 2009 in Rajasthan (90%) and Gupta *et al*, 2014 in Bhopal (83.6%) (Reddy *et al*., 2013; Logaraj *et al*., 2014; Talwar *et al*., 2009; Charpe and Kaushik, 2009; Gupta *et al*., 2014). Out of a total of 208 subjects who participated in the study, 108 were medical and 100 were engineering professionals. The prevalence of CVS was significantly greater among engineering (92%) as compared to medical (74.07%). Logaraj *et al* in 2014 reported similar prevalence among medical (78.6%) and engineering (81.9%) college students (Logaraj *et al*., 2014). The most common symptom of CVS in our study was neck and/or shoulder painreported by 50.96% of our study participants. Backache was reported by 31.73% of them. In the study conducted by Talwar *et al* on computer professionals, 76.5% reported musculoskeletal problems (Talwar *et al*., 2009). Logaraj *et al*, in their study done on students in Chennai found the prevalence of neck and/or shoulder pain to be 60.7% and 61.9% among medical and engineering students respectively, which was the highest reported symptom (Logaraj *et al*., 2014). Sharma *et al*, who studied computer related problems among IT professionals in NCR found the prevalence of musculoskeletal problems to be 77.5% (Sharma *et al*., 2006).

Significantly higher prevalence of presence of any CVS symptom were seen among engineering as compared to medical professionals in our study ($p<0.05$), individually neck/shoulder pain ($p<0.001$), sore/tired eyes ($p<0.05$), dry eyes ($p<0.05$) and blurred vision ($p<0.05$) were greater among engineering professionals. Similar findings were reported by Logaraj *et al*, for redness, burning sensation, blurred vision and dry eye, all of which were significantly more among engineering students (Logaraj *et al*., 2014). A statistically significant difference was found in our study for presence of CVS with hours of computer use per day, where greater prevalence of CVS was seen in study participants who used the computer for 4 hours or more. Reddy *et al*, Logaraj *et al* and Talwar *et al* also reported increasing symptoms of CVS with increased hours of computer use, the difference being statistically significant in all the studies (Reddy *et al*., 2013; Logaraj *et al*., 2014; Talwar *et al*., 2009). Our study found that a significantly higher proportion of participants who viewed the computer at more than the prescribed distance were free of CVS symptoms. The study participants who had lighting above their workstation showed significantly lesser symptoms of CVS as compared to those who worked in diffuse lighting, the finding being similar to that reported by Talwar *et al*. (2009). Logaraj *et al* found a significant association between symptoms of CVS and spectacle/contact lens use, and so did Reddy *et al*, though our study did not show any such association (Logaraj *et al*., 2014; Reddy *et al*., 2013). Reddy *et al* found statistically significant reduction in symptoms of CVS between students who viewed the computer screen below eye level than those who viewed at or above eye level (Reddy *et al*., 2013). Our study, on the contrary, did not show any reduction of symptoms with level of computer screen use.

Conclusion

In our study conducted among medical and engineering professionals of India, almost four out of five of the study participants reported symptoms of Computer Vision Syndrome. The engineering professionals showed significantly higher prevalence of CVS as compared to medical professionals. Presence of symptoms was significantly higher in those who used computer for 4 hours or more per day, among those who viewed the computer at a distance less than 15 inches and those who worked in the absence of overhead light at their work station.

Conflict of interest: None

REFERENCES

American Optometric Association. The effects of computer use on eye health and vision, 1995. http://www.aoa.org/patients-and-public/caring-for-your-vision/protecting-your-vision/computer-vision-syndrome?sso=y [Last accessed on 06 March 2017]

Blehm C, Vishnu S, Khattak A, Mitra S, Yee RW. 2005. Computer vision syndrome: A review. Survey of Ophthalmology, 50(3):253-62.

Charpe NA. and Kaushik V. 2009. Computer vision syndrome (CVS): Recognition and control in software professionals. *J Hum Ecol*., 28(1):67-69.

Gupta R, Gour D, Meena M. 2014. Interventional cohort study for evaluation of computer vision syndrome among computer workers. *Int J Med Res Rev*., 2(1):40-44.

Logaraj M, Madhupriya V, Hegde SK. 2014. Computer vision syndrome and associated factors among medical and engineering students in Chennai. *Ann Med Health Sci Res*., 4:179-85.

Reddy SC, Low CK, Lim YP, Low LL, Mardina F, Nursaleha MP. 2013. Computer vision syndrome: A study of knowledge and practices in university students. *Nepal J Ophtalmol*., 5(10):161-8.

Sharma AK, Khera S, Khandekar J. 2006. Occupational health problems and role of ergonomics in information technology professionals in national capital region. *Indian J Community Med*., 31:36-8.

Talwar R, Kapoor R, Puri K, Bansal K, Sinsh S. 2009. A study of visual and musculoskeletal health disorders among computer professionals in NCR Delhi. *Indian J Community Med*., 34:326-8.

****