



A Cross Sectional Study to assess prevalence of Computer Vision Syndrome and vision related problems in Computer Users

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Abstract

The aim was to assess prevalence of computer vision syndrome and find association of various factors with occurrence of symptoms.

Methods- *In this cross-sectional study participant were surveyed using self administered questionnaire and underwent complete ophthalmological and dry eye assessment.*

Results- *A total of 150 participants aged 18-40 years were examined. Majority of the patients were in the age group of 26-30 years, who accounted for 57 cases i.e. 38% of total cases. Male and Female sex distribution was unequal in this study. Males 81 (54%) and females 69 (46%). The prevalence of symptoms of CVS was found to be 75.33% (113/150); most disturbing symptom was headache 101/150 (67.33%), tired eyes 76(50.66%) ,pain behind eyes 74(49.33%) Majority of patients 97 (64.66%) used computer for 4-6 hours. Abnormal TBUT 56 (37.4%), Schirmer's Test II 42 (28%), Tear height meniscus 59 (39.4%), fluroscin staining findings 15 (10%), lissamine green staining findings 20 (13.33%) and conjunctival impression cytology findings were reported as mild dysplasia in 25 (16.66%), moderate dysplasia 7(4.66%), severe dysplasia 3 (2%), acute inflammatory lesions 5 (3.33%) & inclusion of Chlamydia trachomatis body was seen in 1. Knowledge about CVS was present in 65(43.33%).*

Conclusion- *Most participants had CVS and its severity was correlated with prolonged working hours on computer. There was marked unawareness about CVS.*

Keywords- *Computer vision syndrome, conjunctival impression cytology, fluroscin staining, lissamine green staining, tear film break up time, Schirmer's test.*

INTRODUCTION

Computers are being used increasingly by large number of people today. There has been a great advancement in the information technology in the past few decades. The use of computer has made life easier and has increased the work productivity tremendously^[1]. In this present era, with excessive computer usage there has been an outbreak in computer related health problems. This has led to an increase in the number of patients complaining about ocular and non ocular symptoms related to computer use which are being grouped together as COMPUTER VISION SYNDROME (CVS).

Computer has become an integral part of office equipments and in routine life. However, working at a computer terminal is not free from health hazards and computer users are experiencing a variety a vision related complaints which is collectively referred to as Computer Vision Syndrome(CVS) (Tamez-Gonzalez et al, 2003)^[2].

American Optometric Association (AOA) has defined Computer Vision Syndrome as a complex of eye and vision associated problems mainly related to activities which stresses the near vision and which are experienced in relation or during the use of computer (American optometric Association 2010, Loh and Reddy, 2008).^{[1][3]}

Blehm et al, 2005^[4] categorized the symptoms in four major categories:

- i. Asthenopic-eye strain, tired eyes, sore eyes
- ii. Ocular Surface Related-watering, irritation, dry eye
- iii. Visual-blurred vision, slowness of focus change, double vision and
- iv. Extraocular-neck pain, backache, shoulder pain

Numerous factors accounting for Computer Vision Syndrome are duration of usage, poor lighting, screen brightness, environmental factors, vision problems & improper work station set up also account for eye & visual problems associated with computer.

The aim of this study is to identify the prevalence of CVS AND major visual and systemic manifestations among the computer users also

enlighten the public health professionals on the need of spreading awareness regarding health hazards associated with computer use.

MATERIALS AND METHODS

Study was cross sectional study conducted in MGM Medical college, Indore between 2015 July-2015 june. The study was approved by the local ethics committee and written informed consent was obtained from all subjects prior to participation.

All participants were surveyed using self administered questionnaire and complete ophthalmic examination was done.

A total of 150 computer users below 40 years age were included.

Inclusion Criteria

1. Subject working on computer for atleast 3 hours per day daily since 6 months and not using lubricating drops
2. Subject giving consent for the study

Exclusion Criteria

1. Subject who did not give consent for the study
2. Subjects older than 40 years are excluded because of age induced vision problems of presbyopia
3. Contact lens users
4. Known case of dry eye disease and ocular motility disorder.
5. Subject using drugs (systemic/topical) causing dry eye

COMPLETE OPHTHALMIC ASSESSMENT

The patients were examined for their VA on snellen's chart on the first OPD visit. Detailed history (ocular and systemic symptoms) were noted and they were requested to fill the questionnaire provided to them. The detailed examination of patients were done under the following heading:

1. HISTORY

- a) Subjects were registered with their name, age, sex and address
- b) Relevant history from the patients was taken regarding
 - Headache, blurring of vision, watering, redness

- Shoulder pain, neck pain, backache
- Rule out conditions associated with dry eye

2. EXAMINATION

a) A comprehensive general examination of all subjects was done to rule out any systemic illness. Any history regarding diabetes, hypertension, Rheumatoid Arthritis, Alcohol abuse, smoking, tobacco intake was be noted.

b) ON OCULAR EXAMINATION

1) Vision Testing-

BCVA DISTANT VISION-

Right eye-.....

Left eye-.....

BCVA NEAR VISION

Right eye-.....

Left eye-.....

2) SLIT LAMP EXAMINATION-

A) Detailed Anterior segment examination under diffuse illumination-

B) Posterior segment examination-

3) TEAR FILM ANALYSIS:

i) Tear Film Meniscus Height-

ii) TBUT TEST-

iii) Fluroscein Staining Findings-

iv) Lissamine green staining findings-

v) Schirmer's Test Findings-

4) Conjunctival Impression Cytology

RESULTS

Table 1- Distribution of study participants as per gender

Gender	Number Of Cases		CVS Symptoms Present		No Symptoms	
	Total	%	Total	%	Total	%
Male	81	54	59	72.83	22	27.17
Female	69	46	54	78.26	15	21.74
Total	150	100	113	75.33	37	24.67

Table-2 Distribution of Study Participants As Per Age

Age	Number Of Cases		CVS Symptoms Present		No Symptoms	
	Total	%	Total	%	Total	%
<20 Years	15	10	11	73.4	4	26.6
21-25 Years	52	34.66	41	78.84	11	21.15
26-30 Years	61	40.66	47	77.04	14	22.95
31-35 Years	15	10	8	53.33	7	46.66
36-40 Years	7	4.66	6	86	1	14

Table-3 Distribution according to Number of Hours Working on Computer per Day

Duration	Total		CVS Present		No Symptoms	
	Total	%	Total	%	Total	%
3 Hours	11	7.34	10	90.9	1	9.09
4-6 Hours	97	64.66	64	66.66	33	34
7-8 Hours	24	16	22	92	2	8
>8 Hours	18	12	17	94.44	1	5.5
Total	150	100	113	75.34	37	24.66

Table 4:-Distribution of Visual & Other Complaints

Symptom Category	CVS Symptoms	Present	
		Total	%
Ocular Symptoms	Watering eyes	41	27.33
	Dry eyes	56	37.33
	Itchy eyes	50	33.33
	Pain behind eyes	74	49.44
	Tired eyes	76	50.66
Visual symptoms	Redness	57	38
	Blurred vision	59	39.33
Systemic symptoms	Double vision	42	28
	Shoulder pain	49	32.66
	Neck pan	58	38.66
	Back pain	101	67.33
	Headache	101	67.33

Table 5: Comparison of TBUT Findings among Computer Users

Variables	Total No. of Cases		CVS Symptoms Present		No Symptoms	
	Total	%	Total	%	Total	%
TBUT (<10sec)	56	37.4	49	88	7	12
TBUT (>10sec)	94	62.6	65	69	29	31
Total	150	100	114	76	36	24

Table 6:- Distribution of Fluroscein Staining In Computer users

Fluroscein Staining In All 5 Quadrants	Total No. of Cases		CVS Symptoms Present		No Symptoms	
	Total	%	Total	%	Total	%
Score >> 3	15	10	15	100	0	0
Score << 3	24	16	19	79.16	5	20.84
Score 0	111	74	80	72.1	31	27.9
Total	150	100	114	76	36	24

Table 7: Comparison of Schirmer's Type-2 Test

Variables	Total No. of Cases		CVS Symptoms Present		No Symptoms	
	Total	%	Total	%	Total	%
TBUT (<10sec)	56	37.4	49	88	7	12
TBUT (>10sec)	94	62.6	65	69	29	31
Total	150	100	114	76	36	24

Table 8:- Distribution of Fluroscein Staining In Subjects

Fluroscein Staining	Total		Cvs Symptoms Present		No Symptoms	
	Total	%	Total	%	Total	%
All 5 quadrants	Total	%	Total	%	Total	%
Score More Than 3	15	10	15	100	0	0
Score Less Than 3	24	16	19	79.16	5	20.84
Score 0	111	74	80	72.1	31	27.9
Total	150	100	114	76	36	24

Table No.9- Distribution of Lissamine Green Staining in Subjects among Study Participants

Van Bijsterveld Staining	Total No. of Cases		CVS Symptoms Present		No Symptoms	
	Total	%	Total	%	Total	%
0	115	76.6	83	72.17	32	27.83
Score <4	12	8	12	100	0	0
Score >4	23	15.4	20	87	3	13
Total	150	100	115	77	35	23

Table 10 - distribution of cases according to conjunctival impression cytology findings in computer users

Conjunctival Impression Cytology Grading	Total		CVS Symptoms Present		No Symptoms	
	Total	%	Total	%	Total	%
Normal Cytology	79	52.66	69	87.34	13	16.45
Mild Dysplasia	25	16.66	22	88	3	12
Moderate Dysplasia	7	4.66	5	71.42	2	28.57
Severe Dysplasia	3	2	3	100	0	0
Acellular	31	20.66	15	48.38	16	51.61
Acute Inflammatory Lesions	5	3.33	5	100	0	0
Total	150	100	111	74	39	26

DISCUSSIONS

This study included 150 cases of computer users examined at MYH. The prevalence of CVS was 75.33%. Different outcome were reported on comparing the results with other studies AK Sharma et al (2006) [5] reported prevalence of 76%, Zairina et al (2011) [6]- 68.1% , Seshadhri et al (2014)[7] 69.3%

In our study knowledge about Computer vision syndrome was present in 65 participants (43.33%). Other studies Akinbinu et al (2013) [8] reported 27% and Huda Zainuddin et al (2014) [9] reported 35.6% and Amirul F Z (2015) [10] reported 48.8% participants had knowledge about CVS.

The most experienced symptoms were Headache-101 (67.33%), tired eyes 76 (50.66%) and pain behind eyes 74 (49.33%). The duration of computer work is directly related to eye symptoms and longer

duration tends to result in long lasting complaints even after work is finished. Stella C et al (2007)^[10]- Eyestrain (42.7%), blurred vision (45.7%) and Saurabh Shrivastava et al (2012)^[11]- Redness (40.2%), stiffness in neck (45.2%) Kp Mashige et al (2013)^[13] - Eyestrain (89%), headache 81%.

In our study, majority 64.66% of study participants were using computer daily for 4-6 hours.

Other studies like Stella C et al (2007)^[10], Zairinia Et al (2011)^[6] and Lograj et al (2014)^[12] also reported significant association of long working hours with computer and adverse effect.

Following strategies have been reported by researchers to reduce the symptom of CVS- Taking regular breaks in between use of computer was the most preventive measure taken for relief of symptoms in form of rule 20/20/20 as suggested by Anshel (2005)^[14] i.e after 20 minutes of computer use, one should look at distant object 20 feet away for 20 seconds, maintaining good sitting posture, use of eyedrops, use of antiglare screen has been reported to reduce the symptoms of CVS.

In the current study dry eye workup findings showed abnormal TBUT – 37.4% & positive schirmer's test- 28% of study participants, fluorescein staining findings reported in 10% and lissamine green staining findings were reported in 13.33%.

Conjunctival impression cytology showed normal cytology in 53.33%, mild dysplasia in 16.66%, moderate dysplasia in 4.6% and severe dysplasia in 2% of study participants. Other studies Alireza Dehghani et al (2008)^[15] reported positive schirmer's findings in 38.5%, Sanjeev kumar et al (2013)^[16] reported conjunctival impression cytology- stage 4 in 90% and Rahul Bhargava et al (2014)^[17] reported TBUT- 48.5%, Schirmer's test- 38.4% and Conjunctival impression cytology abnormal in 38.4%

CONCLUSION

In conclusion, in our study males were predominantly affected because of their nature of work. The age group of 26-30 years formed the core group of people to get symptoms of CVS.

Though, in our study the sample size was small the final outcome showed majority of computer users were suffering from Computer Vision Syndrome. Proper knowledge, work station setup and regular follow up with ophthalmologist and physician can reduce the computer related morbidity and improve the work performance among computer users.

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