



## Original Article

# Cytopathological changes on CIC (Conjunctival Impression Cytology) among computer users: A study of 150 cases

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## Abstract

**Background:** In present era, when computer use was restricted to office work; today, computer usage has extended to teaching at schools and for recreational purpose also. Therefore, excessive and rampant computer usage 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).

**Objectives:** To determine the prevalence of CVS, spread knowledge and awareness about CVS among computer users and evaluate the cytopathological changes on Conjunctival Impression Cytology (CIC) among computer user and ocular manifestations amongst computer users.

**Material and Methods:** Cross sectional study was conducted in Department of Pathology in MGM medical college and MY Hospital, Indore from July 2015 to June 2016. All patients underwent complete ophthalmic examination. The detailed examinations of total 150 patients were done under the following heading (history of ocular and systemic symptoms, ocular examination and CIC).

**Result:** Majority of the patients were in the age group of 26-30 years, Most frequent symptom were headache (67.33%). Percentage of patients with CVS were increased with increased duration of computer use >8 hours was reported to be 17/19 (94.44%). The conjunctival impression cytology findings were reported as mild dysplasia in 25 cases moderate 7 cases, severe 3 cases, 1 case was reported with Inclusion of Chlamydia trachomatis and a cellular 31 cases.

**Conclusion:** We found that those who used computers daily for long hours developed more CIC changes than those who worked at the computer for a shorter daily duration. Hope this study will also help in implementing corrective measures to ease the problems faced by the computer users and reduce the occurrence of CVS.

**Keywords:** Concunctival Impression Cytology (CIC), Computer Vision Syndrome (CVS), Computer Users.

## Introduction

Computers are being used increasingly by large number of people today. Using computers has become a 21<sup>st</sup> century necessity<sup>[1]</sup>. In present era, with excessive and rampant computer usage

there has been increasing 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).

American Optometric Association (AOA) has defined CVS as a complex of eye and vision associated problems mainly related to activities which stresses then ear vision and which are experienced in relation or during the use of computer<sup>[1,2]</sup>

Factors accounting for CVS are duration of usage, poor lighting, screen brightness, environmental factors, vision problems & improper work station setup also account for eye & visual problems associated with computer. In the present study, we determine the prevalence of CVS, spread knowledge and awareness about computer vision syndrome among computer users; evaluate cytopathological changes on Conjunctival Impression Cytology (CIC) among computer user and ocular manifestations amongst computer users.

### Material and Methods

Cross sectional study was conducted in Department of Pathology in in MGM medical college and MY Hospital, Indore from July 2015 to June 2016. All patients underwent complete ophthalmic examination. The detailed examinations of total 150 patients were done under the following heading: (history of ocular and systemic symptoms, ocular examination includes VA on snellen's chart, slit lamp examination, Tear film analysis and CIC).

A non-invasive method of impression cytology is done to study cellular structure. CIC was performed after anesthetizing the eye with one drop of 4% Xylocaine. Participants were asked to look down as far as possible. One person held the upper and lower lid, while the researcher held a glass slide with thumb and index finger to fix both the edges of glass slide and placed it gently onto the upper bulbar conjunctiva and was removed after 1-2 second. After taking impression over the slide it was allowed to air-dry for 1 min and then fixed with alcohol fixative. The slide was labeled and numbered and was received in pathology department for cytological examination. The slide

was stained with PAP stain. The mounted slide was first examined under the microscope with  $\times 10$  high power field (HPF). After localization, cells were then analyzed with  $\times 40$  HPF magnification. At least X10 HPF were examined for epithelial cells. The morphology of conjunctival squamous epithelial cells are studied and classified.

### Results

Majority of the patients were in the age group of 26-30 years, who accounted for 61 cases i.e. 40.66% of total cases. Maximum number of patients 77(51%) were working on computer since 1-2 years. Most frequent symptom were headache (67.33%), tired eyes (50.66%), pain behind eyes (49.33%) and dry eyes (37.33%). Percentage of patients with CVS were increased with increased duration of computer use >8 hours was reported to be 17/19 (94.44%) (Table 1& 2).

In our study, patients who were using computer for long hours showed dysplastic changes in their conjunctival epithelial cells. Out of 150 patients, 80 patients had normal CIC findings. Twenty five patients showed mild dys plastic changes in their CIC findings. Seven patients showed moderate dysplastic changes in their CIC findings. Three patients showed severe dysplastic changes in their CIC findings. Four patient showed acute inflammatory lesions in their CIC findings. One patient showed inclusions of Chlamydia. (Table 3&4) (Figure 1).

**Table-1: Distribution of study participants as per Gender and Age**

	Number of Cases		CVS Symptoms		No Symptoms	
	Total	%	Total	(%)	Total	(%)
<b>Gender</b>						
Male	81	54	59	72.83	22	27.17
Female	69	46	54	78.26	15	21.74
<b>Age</b>						
<20Years	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	4

**Table 2 : Distribution of Visual & Other Complaints among Study Participants**

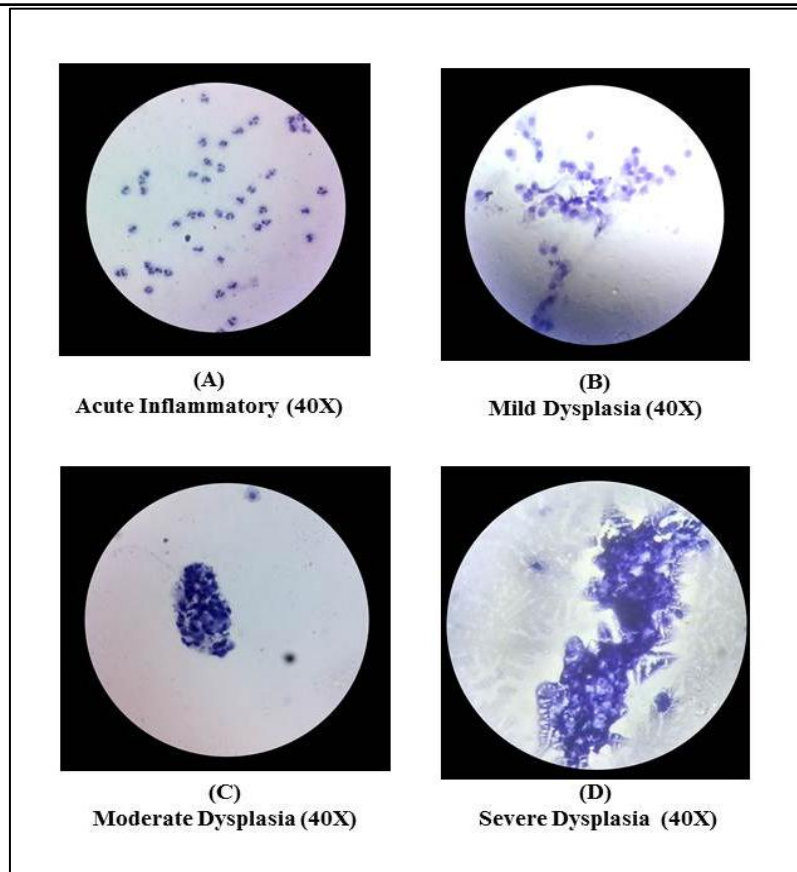
Symptom Category	CVS Symptoms	Present	
		Total	%
Ocular Symptoms	Watering eyes	41	27.33
	Dry eyes	56	37.33
	Itchy eyes	50	33.33
	Painbehind eyes	74	49.44
	Tired eyes	76	50.66
	Redness	57	38
Visual symptoms	Blurred vision	59	39.33
	Double vision	42	28
Systemic symptoms	Shoulder pain	49	32.66
	Neck pain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

**Table 3 : Distribution of cases according to CIC findings in computer users**

CIC Grading	Total No. of Cases		CVS Symptoms		No Symptoms	
	Total	%	Total	%	Total	%
Normal Cytology	80	53.33	60	75	20	25
Mild Dysplasia	25	16.66	23	92	2	8
Moderate Dysplasia	7	4.66	6	85.71	1	14.28
Severe Dysplasia	3	2	3	100	0	0
A cellular	30	20	19	63.33	11	36.66
Others (Inflammatory and infective)	5	3.33	2	40	3	60
Total	150	100	113	75.33	37	24.66

**Table 4: Distribution of cases according to CIC findings and computer use**

CICGrading	Total No.of Cases			
	Mild Dysplasia	Moderate Dysplasia	Sever Dysplasia	Acute Inflammatory lesions
3-6hours	16	6	2	3
7-8hours	9	1	1	2
Total	25	7	3	5



**Figure 1:** Cytopathological findings of different stages of dysplasia on CIC in CVS patients:

(A) Acute Inflammatory (40X), (B) Mild Dysplasia (40X)  
 (C) Moderate Dysplasia (40X), (D) Severe Dysplasia (40X)

## Discussion

Dryness of eyes is a common problem worldwide and one of the frequent reasons for ophthalmic consultations. The role of personal computers and internet has increased tremendously in our day to day life. Most jobs are now computer dependent, and people have begun to spend more time in front of the computers at work, home, and even at school. Prolonged computer usage is often accompanied by dryness of eyes.<sup>[3]</sup> CVS adds to the overall burden of dry eye in the community and has now become a significant public health problem.

The aim of the present study was to determine the prevalence of computer vision syndrome, spread knowledge and awareness about CVS among computer users and evaluate the cytopathological changes on CIC among computer user and ocular manifestations amongst computer users. The study was conducted on 150 patients out of which the prevalence of computer vision syndrome our study was observed to be 75.33%.

The findings of our study were corresponding to the findings of other studies.<sup>[4-8]</sup> The most experienced symptoms were Headache, Tired Eyes, Pain behind eyes-101/150(67.33%), 76 (50.66%) & 74(49.33%) respectively. *Bali et al* reported eye strain (97.8%) and headache (82.1%) as chief presenting symptoms of CVS in their study population<sup>[9]</sup>.

In our study CIC with abnormal tear film analysis were observed. CIC findings were reported to be showing mild dysplasia in 25 (16.66%), moderate 7(4.66%), severe 3(2%), acute inflammatory lesions 5(3.33%) & a cellular 31 (20.66%). *Kumar S. et al* did impression cytology in computer users and control group<sup>[10]</sup>. CIC results in control group were of stage 0 and stage I, while in computer user group showed results between stage II to stage IV. Among the computer users, the majority (>90%) showed stage III and stage IV changes. Those who used computers daily for long hours developed more CIC changes than those who

worked at the computer for a shorter daily duration.

Rahul Bhargava et al found measurement of TBUT, Schirmer's and CIC were abnormal in 48.5%, 29.1% & 38.4% symptomatic computer users respectively as compared to 8%, 6.7% & 7.3% symptomatic controls respectively. He concluded DESS should be used in combination with TBUT and CIC for dry eye evaluation in computer users<sup>[11]</sup>.

### Conclusion

This showed that a person who uses computer daily for long hours develops more CIC changes than those who have a short duration of computer work. Although the sample size in our study is small, the findings are very significant. More detailed and comprehensive clinical studies to evaluate the effect of computer use on the ocular surface are necessary. This study will hopefully enlighten the public health professionals on the need of spreading awareness regarding health hazards associated with computers use. It will also help in implementing corrective measures to ease the problems faced by the computer users and reduce the occurrence of CVS.

### Conflict of Interests

There was no conflict of interests with respect to all authors.

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