Computer vision syndrome: A major concern for VDT users

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■**ABSTRACT :** Computer operators may experience Computer Vision Syndrome (CVS). Majority of authors agree with the evaluation that computer work is related to visual fatigue and discomfort appearance. It is the complex of eye and vision problem related to computer work which are experienced during or related to computer use. Survey on computer workers shows that vision discomfort is most frequent among computer users which may be due to frequent movement of eyes from monitor to the written material to be typed or vice versa. Other involved factors leading to visual fatigue and discomfort may be improper height of screen, poor lighting and reflection due to screen position or glare. Therefore, a study was conducted on 120 female VDT users working in various banks a of Ludhiana City to assess their CVS by taking subjective response and by using two Scientific scales *i.e.* Ocular Surface Disease Index (OSDI) and Aramuc Scientific Scale. Ocular Surface Disease Index (OSDI) demonstrates sensitivity and specificity in distinguishing between normal subjects and patients with dry eye disease and its results showed that poor vision, sensitivity of eyes and blurred vision were the main visual problems faced by respondents on the five point scale and got I, II and III ranks respectively. Whereas Aramuc Scientific Scale indicates a true dry eye and its results showed that redness, itching, blurred vision were the main symptoms indicating dry eye as they got I and II ranks respectively. Therefore, it was concluded that though the respondents faced many visual problems in relation to workstation design but they did not do anything to improve the design of the workstation which may be due to the lack of awareness at their part. So the need was felt to suggest ergonomic intervention in this regard

■**KEY WORDS:** Computer vision, Syndrome, VDT users

■**HOW TO CITE THIS PAPER :** Kaur, Khushdeep, Kaur, Harpinder and Sidhu, M.K. (2015). Computer vision syndrome: A major concern for VDT users. *Asian J. Home Sci.,* **10** (1) : 250-253.

The last two decades have witnessed a rapidly changing trend towards the application of Video Display Terminal (VDT) technology for information management in the workplaces and homes. Most office workers use computers for at least some of the tasks that they perform and many use VDTs for the majority of time that they spend at work. Computer operators may usually experience Computer Vision Syndrome (CVS). Majority of authors agree with the evaluation that computer work is related to visual fatigue

and discomfort appearance It is the complex of eye and vision problem related to computer work which are experienced during or related to computer use. Symptoms include eyestrain, burning eyes, blurred vision and headache. The layout of the computer workstation can increase the visual demand on operators. Survey on computer workers showed that vision discomfort was most frequent among computer users (Das and Ghosh, 2010). Visual discomfort includes eyestrain burning eyes, blurred vision and headaches. It is estimated that between 50 to 90 per cent of American population of VDT users have experience with determined aspect of eyestrain (Dillon *et al.,* 1999). VDT design, workplace ergonomics, lighting levels, glares and high demanding visual task can all contribute to the development of visual symptoms and complaints. Therefore, visual discomfort and related symptoms occurring in VDT workers and their related causes must be recognized to avoid computer vision syndrome, which was the major objective of the present study.

■ **RESEARCH METHODS**

Field survey was conducted on female employees working on Video Display Terminals (VDT) in different banks of Ludhiana district. Out of four zones of Ludhiana city, two zones were randomly selected. Out of each selected zone, 60 female employees in the age group of 25-35 years working in various private and nationalized banks as VDT users were purposively selected, thus making a total sample of 120 respondents. Both subjective and objective scales were used to analyse computer vision syndrome experienced by the respondents.

■ **RESEARCH FINDINGS AND DISCUSSION**

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Visual problems faced by respondents at their workstation :

Survey on computer workers shows that vision discomfort is most frequent among computer users which may be due to frequent movement of eyes from monitor to the written material to be typed or *vice versa* (Snehalatha, 2007). Other involved factors leading to visual fatigue and discomfort may be improper height of screen, poor lighting, and reflection due to screen position or glare. Therefore, visual problems faced by respondents were assessed by :
– Taking subjective responses for visual problems.
– Using ocular surface disease index .
– Using aramuc scientific scale.

Subjective responses for visual problems :

Table 1 shows that respondents felt significant visual problems like tiredness in eyes (89.16%), heaviness (58.33%), frequent headache (51.66%) and itchy eyes (4.72%). Whereas, double vision and glare in eyes were the least felt visual problems as these were felt only by 16.66 per cent and 3.33 per cent of respondents, respectively. These results are supported by Sandhu (2001) and Snehalatha (2007) who reported that computer users faced various vision problems like blurred vision, watery eyes, burning and redness of eyes.

Using ocular surface disease index :

This index demonstrates sensitivity and specificity in distinguishing between normal subjects and patients with dry eye disease. The respondents got through OSDI Scale were assessed on a scale of 0 to 100, with higher scores representing greater disability. The detail of the test has been presented in Annexure VII. Mean scores and mean ranks were calculated (Table 2a) on the basis

Table 1: Visual problems faced by respondents		(n=120)
Symptoms indicating visual problems	Percentage[•]	Z
Tiredness in eyes	89.16	23.00**
Heaviness	58.33	12.77**
Frequent headache/migraine	51.66	10.55**
Blinking while concentrating (slow/ fast/ normal)	38.33	6.11**
Itchy eyes	34.16	4.72**
Double vision	16.66	-1.11[NS]
Glare in eyes	3.33	-5.55[NS]

[•]Multiple responses; NS = Non-significant;* and ** indicate significance of values at P=0.05 and P = 0.01, respectively

on various statements given in scale. Table 2a depicts that poor vision, sensitivity of eyes and blurred vision were the main visual problems faced by respondents on the five point scale and got I, II and III ranks, respectively. Whereas, other problems like painful or sore eyes and gritty eyes got IV and V ranks, respectively showing that these symptoms were rarely felt by respondents.

The second part of the OSDI scale indicates that in what way the vision related problems affect the day to day activities of respondents. Table 2b depicts that respondents felt more problems while working on computer followed by watching TV as they got I and II ranks, respectively. Reading and driving at night were some other problems faced by respondents due to poor or blurred vision. Further, OSDI was used to get the level of dry eye disease (Table 3) and it was found that 47.50

per cent of respondents had moderate level of dry eye disease followed by mild level (45.00 %). Only 7.50 per cent of respondents had severe level of dry eye disease when OSDI was analyzed.

Using aramuc scientific scale :

This scale is a numerical scale which indicates a true dry eye. If the total score is greater than 7, it indicates a true dry eye. The respondents were asked for various symptoms which indicates the dry eye on five point scale to get mean score and mean ranks. Table 4 shows that redness, itching, blurred vision were the main symptoms indicating dry eye as they got I and II ranks, respectively. Whereas, other symptoms who got III and IV ranks were 'excess watering of eyes' and 'burning of eyes'.

The least scores *i.e.* V and VI were assigned to the

Table 2a : Ocular Surface Disease Index (OSDI) scale to analyze symptoms related to visual problems faced by respondents		(n=120)
Visual problems faced during the last week	Mean score*	Mean rank
Poor vision	1.89	I
Eyes that are sensitive to light	1.75	II
Blurred vision	1.61	III
Painful or sore eyes	1.48	IV
Eyes that feel gritty	1.21	V

*Multiple responses; On the basis of 5 point scale from all of the time (5) to none of the time (1)

| Table 2b : Ocular Surface Disease Index (OSDI) scale		(n=120)
Obstructions due to vision problems during the last week	Mean score*	Mean rank
Working with a computer	1.82	I
Watching TV	1.70	II
Reading	1.61	III
Driving at night	1.20	IV

*Multiple responses; On the basis of 6 point scale from all of the time (6) to N/A (0)

Table 3 : Level of dry eye disease severity of respondents by using Ocular Surface Disease Index (OSDI)		(n=120)
Level indicating dry eyes disease severity	Number	Percentage
Mild	54	45.00
Moderate	57	47.50
Severe	9	7.50

Table 4 : Symptoms of dry eye experienced by respondents by using aramuc scientific scale		(n=120)
Symptoms indicating dry eye	Mean score*	Mean rank
Redness and itching	3.21	I
Blurred vision/fluctuation (corrected with blinking)	3.03	II
Excess watering	2.14	III
Burning	1.23	IV
Excess mucous discharge (crusting on your lashes and eyes get stuck in the morning)	0.34	V
Sandy or gritty sensation	0.12	VI

*Multiple responses; On the basis of 5 point scale from all of the time (5) to never (0)

symptoms of excess mucous discharge and sandy/gritty sensation. On the basis of overall analysis by using Aramuc Scientific Scale, it was found that 58.00 per cent of respondents had the symptoms showing true dry eyes (Fig. 1).
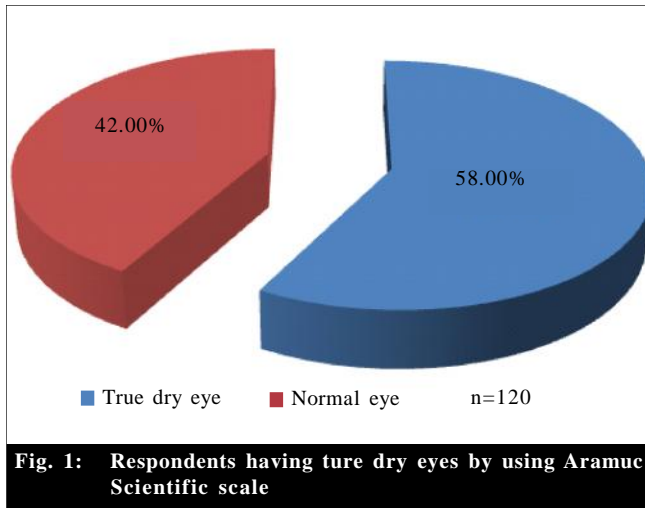
Fig. 1: Respondents having ture dry eyes by using Aramuc Scientific scale

Therefore, it can be concluded that frequent use of computer leads to dry eye disease which can be treated as early as possible to avoid further discomfort to eyes. Also blinking of eyes in between the work makes the eyes relaxed to some extent. Rana *et al.* (2013) also reported that ignorance about causes and consequences had resulted in degradation of quality of vision among majority of users of computer and other digital devices. Kaur *et al.* (2014); Sarkar and Samanta (2007); Arndt (1983); Carter (1994) and Habibi (2001) also worked on the related topic.

Conclusion :

It was also observed that respondents hardly made any change at their workstation design for its improvement. Therefore, it was concluded that though the respondents faced many visual problems in relation to workstation design but they did not do anything to improve the design of the workstation which may be due to the lack of awareness at their part. So, the need was felt to suggest ergonomic intervention in this regard.

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