

# Incidence Of Dry Eyes Amongst The Computer Users

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## ABSTRACT

Computer Vision Syndrome (CVS) is a condition resulting from uninterrupted focus of the eyes on a display device in which the **eye** muscles are strained. The study was conducted with the objective as to find out the incidence and prevention of computers vision syndrome (CVS) particularly “dry eye” in regular computer users. Study design Observational, cross sectional Methodology A “questionnaire proforma” was prepared and distributed to the willing candidates. It was based on symptoms of dry eye, sensitivity of eyes to various environmental conditions, history of medications contributing to dry eye, working hours on computers etc. The visual effects of various display characteristics such as lighting, glare, display quality, refresh rates, and radiation are also briefly discussed. Results Out of 390 regular computer users, 88 (30.3%) were found to have dry eye problem. This study concluded that although the computers vision syndrome is associated with a variety of ocular symptoms related to computer use including eyestrain, tired eyes, irritation, redness, blurred/double vision, headache and shoulder pain, this article was primarily focused on “dry eye” the major contributor to computer vision syndrome symptoms. Management requires a multidirectional approach to improve visual comfort. This approach

includes workstation adjustment, anti-glare fitters, regular breaks during work, appropriate lighting, and ocular therapy. Additional substantial research and studies are needed to better understand CVS such as its causes and creating better solutions to address it. However, lubrication of the eyes and special glasses can help reduce ocular surface related symptoms.

**Keywords:** CVS, dry eye, glare, VDT, ocular discomfort, ocular fatigue,

## Introduction

Computer Vision Syndrome (CVS) is a condition resulting from uninterrupted focus of the eyes on a display device in which the **eye** muscles are strained. Adequate sleep can help recover the fatigued eye muscles. Computers are used universally for both vocational and avocational activities. CVS causes visual discomfort by putting unnatural pressure on human optical system and also results in reduced blinking<sup>1</sup>. Studies have shown that 64 % to 90 % of computer users experience visual discomfort after prolonged computer use<sup>2</sup>. Symptoms like dry eyes, redness, eye strain, blurring of vision, diplopia, neck, back and shoulder pain are collectively referred to as CVS<sup>3</sup>.

It is believed that ocular fatigue is mostly caused by the dryness of the eyes. Environmental factors play a major role in dryness of the ocular surface. These factors include usage of fans and heaters, dry air ventilation, blinking with less amplitude, age, systemic diseases, use of contact lenses , increased exposure to the computer, lens use or other ocular pathology<sup>4-8</sup>. Another important contributor to CVS are the visual effects of video display terminals VDTs such as lightning, glare , radiation caused by using the monitors, the low quality of display screens used, and the positioning of computer monitors.

In addition to ocular discomfort experienced by computer users computer vision syndrome also has an economic impact on a person's life<sup>9-12</sup>. Symptoms can result in possible increased errors, reduced effective work hours due to frequent breaks, increased stress levels and poor visual functions which collectively gives rise to reduced productivity<sup>13-16</sup>. A study carried out in USA showed that total losses due to symptoms of CVS were between 45 to 54 billion dollars annually<sup>17</sup>. Another study showed that 62% of computer workers showed symptoms of the neck, shoulder, and arm, which clearly shows that the impact of CVS in economic terms is on the higher end. Hence, reducing symptoms that negatively affect occupational efficiency will help reduce financial losses.

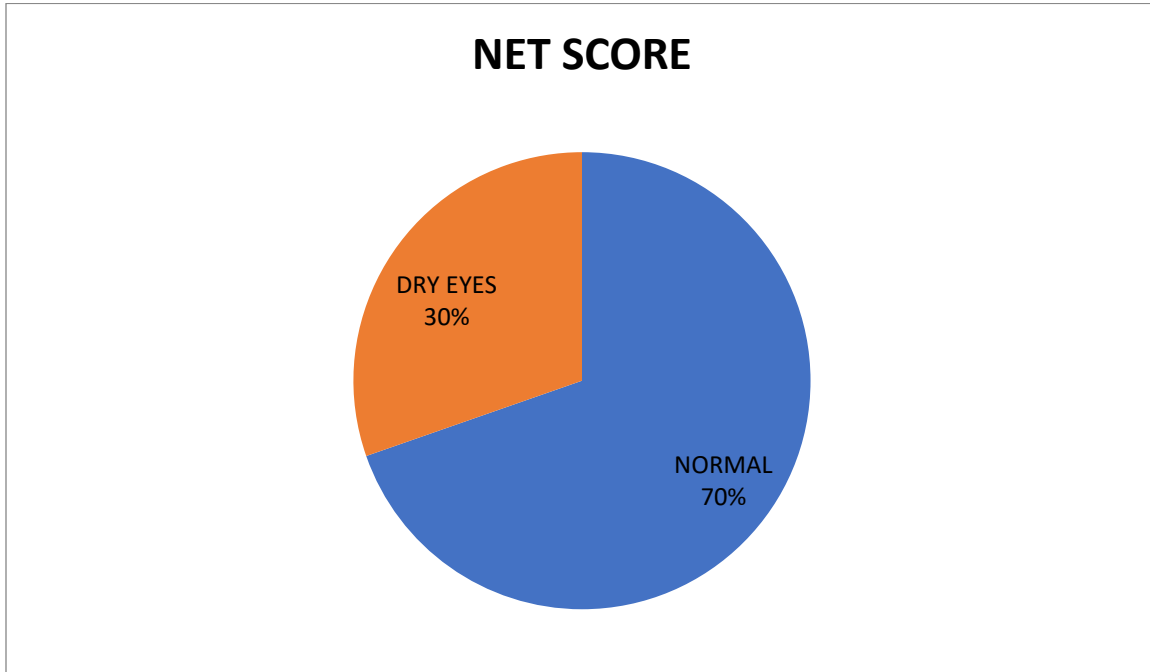
The rationale of this study is to find the incidence of dry eyes amongst computer users in our population and to create an awareness about symptoms of CVS and how to prevent them. Work has been done internationally as to see the prevalence of CVS in their population but no data was found where computer users were assessed for suffering from dry eyes and no local data is found.

## Materials and Methods

All patients reporting to CMH Lahore as outdoor cases from Dec 2018 to Nov 2019 were included in this one year cross sectional study. Approval was taken from the ethical committee and informed written consent was taken from all individuals. Willing males and females between the ages of 20-45 years using computer daily for at least 3 hours were include in the study. Patients with any ocular disease, eye injury, history of ocular surgery, history of any use of ocular medication, anti-allergic, anti-hypertensive, sleeping pills, diuretics, oral contraceptive pills or acne medication were excluded from the study. Especially designed Smart Self-Test Proforma was prepared with symptoms of dry eyes like redness and itching , sandy of gritty sensation, excess watering, photophobia, excess mucus discharge , blurred vision , eye fatigue were included in the proforma. Each symptom was given a score of 0 – 4. 0 indicating never ,1 (rarely), 2(Sometimes), 3 (often), 4 (all the time).Results were compiled on 0 – 24 numerical scale, a score equal to or less than 7 was considered normal and a score of greater than 7 indicated dry eyes. The questionnaire also inquired about any sensitivity to smoke ,air pollutants, wind, light, long term exposure to air conditioning or heaters, use of contact lens, any drug allergies, use of anti-hypertensives , antiacne pills, sleeping pills, diuretics, oral contraceptive pills or hormone replacement therapy in women history of any ocular trauma or surgery. All these factors can act as effect modifiers and if included it the study would have caused bias. Study was observational, cross sectional and 1000 proformas were distributed amongst computer users of which only 390 returned the questionnaire.

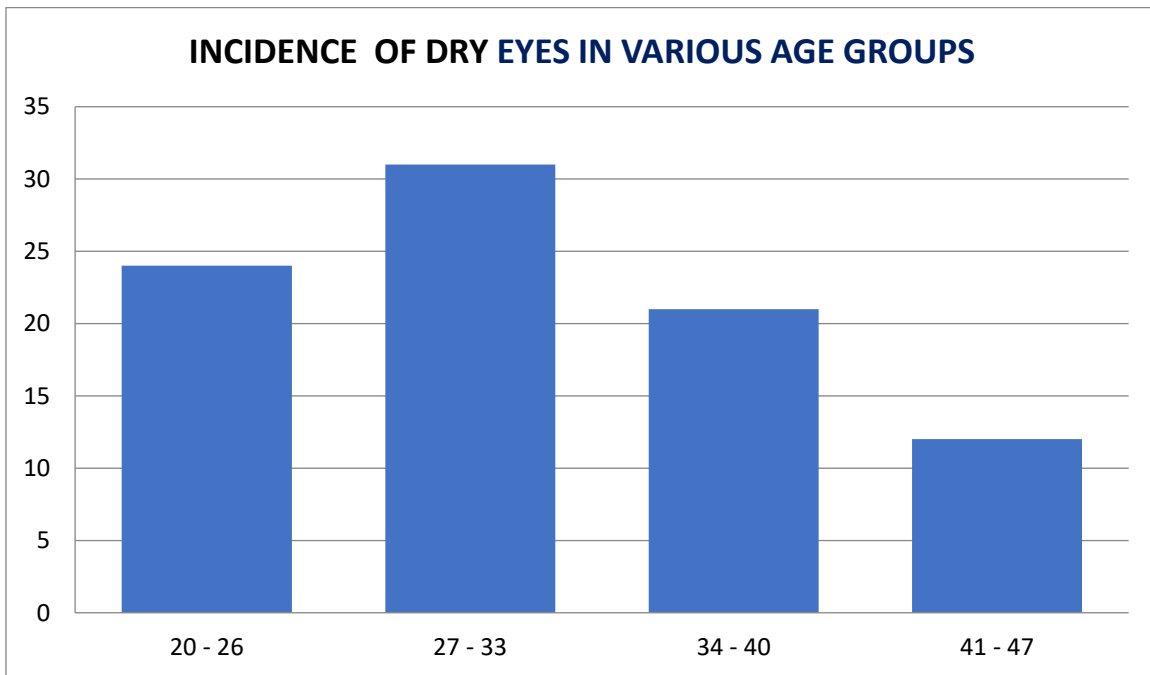
## RESULTS

The results were compiled of the 390 participants all of whom were using the computer for a time period of at least three hours and a total score was calculated irrespective of the grade and type of symptom they had as our focus was to see whether they had dry eyes or not. It was found that 272 (69.7%) had a score of less than 7 and were considered normal , 118 (30.3%) had a score more than 7 indicating the incidence of dry eyes, this result is depicted in figure 1.



**Figure 1**

The data was also stratified for age, the distribution of which for dry eyes is show in figure 2.



**Figure 2**

### **Discussion**

Computer usage has become common practice worldwide. It is estimated that approximately 60 million computer users worldwide experience visual problems as a direct result of computer usage. Computer Vision Syndrome (CVS) is a mix of ocular problems and a condition that results from focusing the eyes on a display screen or device such as a computer for uninterrupted periods of time. Due to a lack of appropriate sleep, the eye muscles of the person viewing the screen are unable to recover from the stress caused by the display screen. The associated symptoms such as eye fatigue, blurred vision, burning sensation, and eye dryness, eye strain, sore eyes, ocular symptoms (watery eyes, irritation, contact lens problems visual problems (blurred vision, poor focusing change, double vision, presbyopia) extra ocular symptoms (neck pain, back pain, shoulder pain)<sup>4</sup>, can be categorized as accommodative or asthenopic symptoms. Among the computer users children and young adults are the most effected group of population. It has been estimated that approximately 70 % of work place computer users in USA suffer from computer vision syndrome<sup>4</sup>.

The ever enhancing use of computers in the work places has resulted in increased complaints by the workers suffering mostly from eye pain, watering, blurred vision, neck and back pains. This merits a determination to search for a definite cause with an effort to focus on individuals.. A study carried out in USA showed that total losses due to symptoms of CVS were between 45 to 54 billion dollars annually<sup>17</sup>. Symptoms in computer workers related to neck, shoulders, and arms may be as high as 62% according to another study.<sup>18</sup> This original study has been designed to highlight the most frequently faced symptom which is the dry eyes amongst the computer users no data was found in regard to this symptom alone and no study has been done on our local population. In this study, of the 290 subjects who returned the questionnaire 88 (30.3%) were suffering from dry eyes which is a significant percentage and needs to be people educated about its incidence and prevention.

Use of computers causes ocular discomfort by putting unnatural pressure on human optical system and reduced blinking. Various factors that cause ocular surface dysfunction are reduced tear film break up time, corneal alterations and meibomian gland dysfunction. These affect the quality of vision and well being during the working hours that collectively results in loss of work productivity. A study carried out in Japan that showed that dry eye associated with a loss of work productivity using the work limitations questionnaire, was estimated to be 4.82% in the dry eye group<sup>13</sup>. It was also inferred that subjects with symptoms had a significantly greater impact on work productivity compared to asymptomatic subjects<sup>17, 18</sup>. Stress, fewer effective work hours, poor visual functions, and possible increase in errors together results in reduced productivity. This has a huge economic impact and also affects an individuals life<sup>7</sup>.

There are various measures to prevent dry eyes and ocular fatigue caused by computer vision syndrome the foremost being to get a proper eye examination done so that correction of refractive errors can be done, proper glasses for computer use can be prescribed and tear film break up time TBUT can be measured to determine the presence of dry eyes<sup>3</sup>. All the patients should be advised

to use antiglare computer screen and anti reflection glasses<sup>3</sup>.It is recommended for the patients to blink more often to prevent dry eyes it includes blinking after every 30 minutes for at least 10 times this will help rewet the eyes and to readjust focus .People using computers for prolong hours should be advised to use preservative free tear substitutes. All these measures can help prevent most of the symptoms of computer vision syndrome especially preventing dry eyes.

The limitations of this study are the ever changing advances in technology which is in fact a real challenge for medical profession and is not only limited to computers but also various hand held devices are causing such symptoms. The importance of research is therefore crystal clear as we need to understand not only the factors but also the physiological mechanisms of these symptoms which will help in development of new and better technology

## CONCLUSION

There is very little awareness about the causes and manifestations of CVS as no research has been done and no local data is available. The advances in technology in the modern era have not only changed the lifestyles drastically but have a firm grip on the minds of young generation which is undeniable. Such advances in technology which are being made on an accelerated pace have resulted in an increased use of multiple fancy devices specially the hand held devices. However, the wide use of computers is still the singular factor which merits detail understanding of all medical conditions associated with their use particularly. This factor alone demands that the research to address these challenges may be done on similar pace for better understanding of the condition. There is a need to clearly understand not only the signs and symptoms of CVS but also the pathology and physiology of the condition in order to face the challenge posed by it and to adopt the remedial measures timely.

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