

## Prevalence Of Computer Vision Syndrome Among Undergraduate Physical Therapy Students

### ABSTRACT

#### BACKGROUND AND AIM

Computers and other digital screens have become an integral part of our life. It raises various ocular problems in the user due to excessive screen time, this study aims to determine the frequency of computer vision syndrome (CVS) in population of under graduate physical therapy student.

#### METHODOLOGY

This was cross-sectional study conducted at Ziauddin College of Rehabilitation Sciences; Karachi during June 2019 to September 2020. A total number of 340 candidates of age 22 years  $\pm$  1.8 including both genders participated in this study. A questionnaire was designed to collect data which was statistically analyzed on SPSS version 20. Whereas descriptive data was calculated as mean, median, mode and standard deviation using graphical representations.

#### RESULTS

88.5% of the students used mobile phones for study purpose out of which 35.3% use it for 4-7 hour and 33% use for 7 to 10 hours a day. The ocular symptoms that students face was burning of eyes (40%), tearing (55%), eye redness (45.3%), diplopia 31.8%, blurred vision (42.9%), eye dryness (23.8%), while extra ocular symptom that was noticed in the study included headache too was (67.9%).

#### CONCLUSION

This study showed that most of the students were found to have a CVS thus screen time guide lines and visual rehabilitation must established.

#### KEY WORDS

*Vision, Syndrome, Prevalence, Headache, Diplopia, Computer*

**Farah Deeba**

Assistant Professor-LNSOP  
Liaquat National Hospital  
Karachi, Pakistan.

[Deeba F. Prevalence of Computer Vision Syndrome among Undergraduate Physical Therapy Students. Pak.j.rehabil. 2021;10(2):86-93]  
DOI: 10.36283/pjr.zu.10.2/012

## INTRODUCTION

Among all of technical devices computer is the one that has eased every individual life with many benefits. But besides that this gadget has other disadvantages along with it. Nowadays computer related health problems are common due to the usage of computer for long duration. Prolonged exposure to VDTs (Video Display Terminal) has been the cause of a visual and ergonomic disorder called "Computer Vision Syndrome". Individuals who work on a computer for long time complain musculoskeletal and eye related disorders like ocular discomfort, eye strain, muscle spasm, cervicogenic headache<sup>1</sup>. According to American Optometric Association computer vision syndrome is an optical disorder that causes stress and fatigue on the eye muscles. The prevalence of this disease is increasing drastically. This disorder is most commonly observed in students who use digital screens for more than 2 hours<sup>2</sup>. Many researches have been done to rule out the prevalence of CVS among different people in their respective occupations. Some of these occupations include office workers, medical students, higher education students and technology professionals etc. It is estimated that over 60 million people have computer vision syndrome<sup>3</sup>. Another study reported (70.5%) prevalence of visual symptoms among computer users<sup>4</sup> while 73% is the prevalence estimated by the studies of this syndrome<sup>5</sup>. Another study which has been done on students of Saudia Arabian University the prevalence was seen 72% with acute symptoms of CVS<sup>6</sup> Increase prevalence of computer vision syndrome due to excessive technology usage results in the loss of productivity and disturbed quality of life<sup>5</sup>. Another research finding among information technology students in a rural engineering college has reported that the prevalence of CVS was 55.4% and among those people 79.3% were the ones who worked on computer more than 3 hours a day<sup>7</sup>. Prevalence of computer vision syndrome was found to be high among students due to continuous usage of computer for more than 3 hours. Those individuals who use computer more than three hours without break are most likely to get computer vision syndrome<sup>8</sup> those people who use computer with spectacles and contact lenses are more prone to have computer vision syndrome.<sup>9</sup> In a study conducted by Jahan, F at el in 2018, three mechanism were explained about extra ocular mechanism, accommodative mechanisms and ocular surface mechanisms.<sup>10</sup> CVS Shows mainly eye symptoms i.e. eye strain, dry or watery eyes with redness, burning of eyes, other issues associated with prolong computer using are fatigue, headache shoulder stiffness and also low back pain<sup>11</sup>. A study reported a 70% increase in intra ocular pressure after using computer for more than 4 hours<sup>12</sup>. Headache, blurred vision and tearing, burning of eyes, watering of eyes, photophobia, itching, neck and shoulder pain, and contact lens troubles are the most common problems.<sup>13</sup> Head ache, burning eyes, photophobia, blurred vision, shoulder pain all these symptoms collectively known as Computer Vision Syndrome. People felt sandy gritty eye irritation; headache, fatigue and excess eye redness and damage to cornea due to CVA.<sup>14</sup> As the computer screen sets above the eye level it can cause eye muscle strain. Amount of glare and light exposure, gaze and font size also become the causative factor for external symptoms of CVS. Due to CVS students felt sandy gritty eye irritation, headache, fatigue and excess eye redness and damage to cornea<sup>15</sup>. Posture can lead to Eye fatigue in frequent computer users<sup>16</sup>. About three-fourths of computer-using bank workers suffered from CVS due to their ergonomically malpractice<sup>9</sup>. People use all the digital screens frequently at a very close distance and varying gaze angles, which should be 40 cm approximately and it seems likely CVS is going to increase in our society day by day<sup>17</sup>. Few steps can minimize the symptoms of CVS such as usage of digital gadgets at a very close distance should be avoid and the distance of the screen from the eye should be 40 cm, while screen angle should also be adjusted at 15 degree in a horizontal plane. The Anti-glare screen filters are also available that can be useful for viewing the screen, along with taking regular breaks between work may relax eye muscles. The 20:20:20 rule<sup>18</sup> (i.e., viewing a target at least

20 feet away for at least 20 seconds every 20 minutes) provides a valuable and easily memorized guideline.<sup>19</sup> Diet can also play a role in recovering from CVA such as Omega-3 fatty acid decreases the tear which can help the patient. While basic economical approach is triphala eye drops and saptamritalauha in the management of CVS<sup>18</sup>. CVS can be prevented by the adjusting the monitor below the eye level, short breaks, eye massage and use of eye lubricants<sup>19</sup>. A study demonstrated that there is a need for awareness in students about ergonomics and related measurements need to be implemented to decrease the rate of increasing CVS<sup>20</sup>. Moreover, the room lights should be much brighter when you are working on digital screen and the contrast of the screen should be high to avoid eye strain. People who have any refractive error should wear glasses when they are using digital screens. It is concluded in this study that by taking these preventions people can overcome CVS.<sup>21</sup>

## METHODOLOGY

### Study Settings

This study was conducted among students of Ziauddin College of Rehabilitation Sciences, Ziauddin University.

### Target Population

Students of Doctor of Physical Therapy (DPT) was targeted for this study.

### Study Design

The design of study was cross sectional.

### Sample Size

A sample was 340 students from ZCRS.

### Duration

The data was collected in duration of a month.

### Data Analysis

All the data was analyzed on the basis of data frequencies using SPSS Data Analysis Techniques (SPSS version 20<sup>th</sup>).

### Inclusion Criteria

Students of Doctor of Physical Therapy (DPT).

The students of age group 17-25 were included in this research study .

Students using digital gadgets more than 2 hours per day.

### Exclusion Criteria

Those who have some eye infections were excluded from this study.<sup>8</sup> Students with preexisting eye diseases. Those whose were unwilling to participate. Students who used drugs for systemic diseases will be excluded.

### Data Collection Tool

#### Computer Vision Syndrome Questionnaire (Cvs-Q)

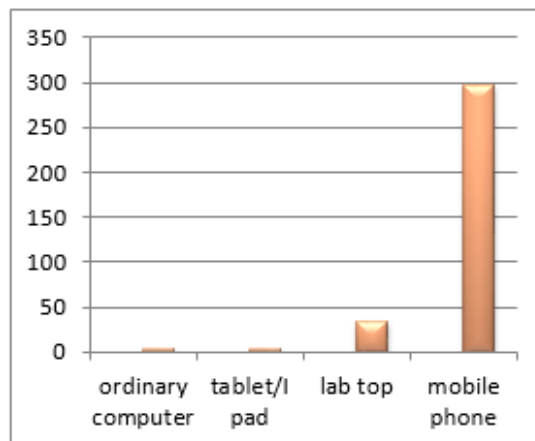
Data was collected through adapted computer vision syndrome questionnaire comprised of 21 questions.

**Data Collection Procedure**

The data was collected from undergraduate physical therapy students of Ziauddin College of Rehabilitation Sciences. After taking the consent from the participants, questionnaire was distributed among them and was asked to return at the same time. It required only 5-7 minutes for filling it.

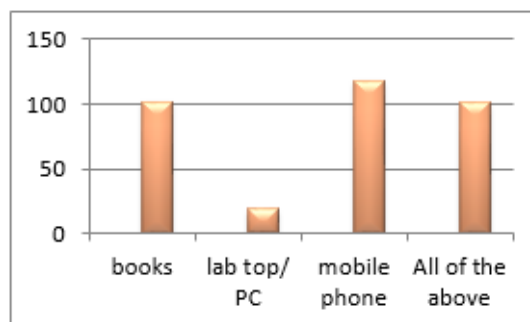
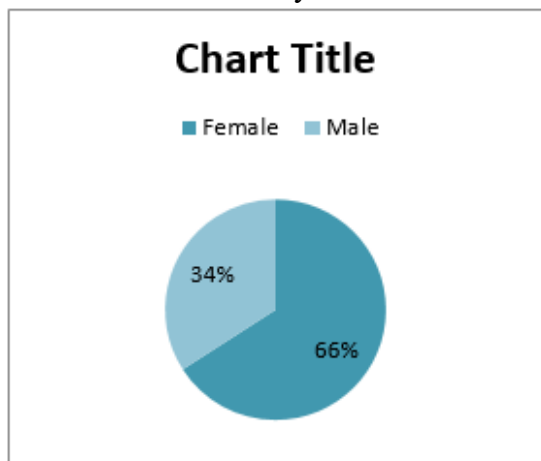
**Data Analysis**

Data was analyzed through frequency distribution using SPSS Data Analysis Techniques (SPSS version 20<sup>th</sup>).

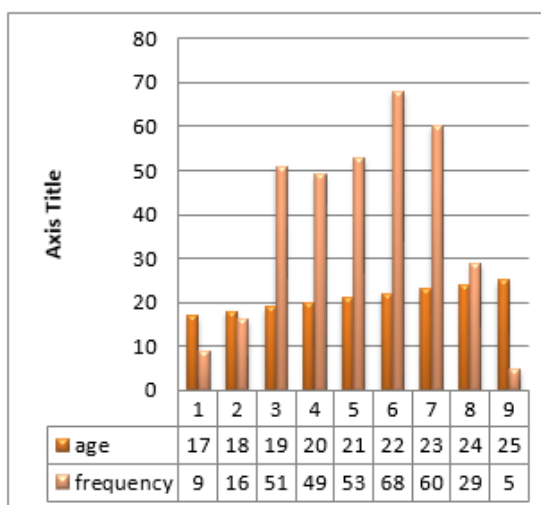


**RESULTS**

In the study, 340 students were enrolled, out of which who have any type of eye infections, eye disease or taking any drugs for systemic disease and unwilling to participate were already excluded from the study before the collection of the data.



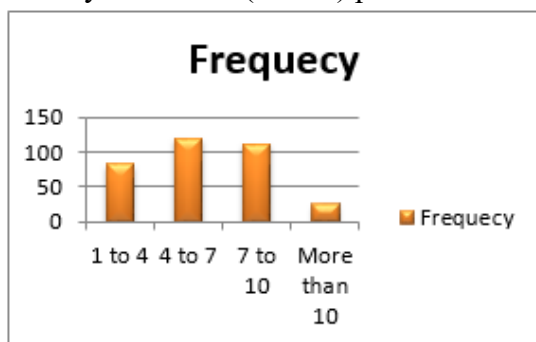
The study was conducted among students of age 17 and 25 years of age who had used screen for studying. Theses participants included both males and females; out of which 65.9 % were female and 34.1 % were male.as shown in figure 1.



The age range of 17 years to 25 years was targeted out of which the computer vision syndrome was found to be most common among the age of 22 years as shown in graph.1

The study showed that out of 340 students 88.5% were those who used mobile phones more frequently and preferred mobile phones to study as well. As shown in graph 2.

By calculating the result of question that what an individual prefer for study, out of 340 respondents, 118 (34.7%) respondents preferred mobile phones, 102 (30%) preferred books to study while 101 (29.7%) preferred all of these ways for their study. As shown in graph 3



The respondents in the study were asked to mention the duration of their sitting time when looking in front of screen the response was mostly 4-7 hours (35.3%) while some of them respond that they spend 7-10 hours (32.9%). Shown in graph 4

Variable	Prevalence Rate
Male	39.65%
Female	71.87%
Total	61%

The total number of students who were enrolled in the study was 340 out of them 207 (61%) lie in the category of presence of computer vision syndrome. In comparison of male and female ration, female are more prone for CVS with the ratio of 71.87% while 39.65% male are affected. Shown in table.1

## DISCUSSION

The study was conducted among the undergraduate medical students of urban Karachi regarding the prevalence of computer vision syndrome and its associated risk factors, result reveal that 67.2% students suffered from this Computer Vision Syndrome. A similar study was conducted in Saudi Arabia in 2017 shows about 72% prevalence rate of Computer Visionary Syndrome among the students.<sup>6</sup> Another study reported (70.5%) prevalence of visual symptoms among computer users<sup>4</sup>. This study point out the most common ocular symptoms like eye irritation that is about 48%, while burning sensation in eyes is around 33%, and eye fatigue about 15%. In one of the previous study conducted in Karachi shown that headache (38%) was one of the most common symptoms that students suffered in extra ocular symptoms include headache 38% and neck shoulder pain 21%.<sup>5</sup> One of the previous study was also reported 70% increase in intra ocular pressure after using computer for more than 4 hours<sup>13</sup> as this study was found that ocular symptoms like burning in eyes 40% , itching in eyes 30.3%, 34.7% claim that they face tearing during the work, eye redness 45.3%, 55.3% claims that they feel pain in eye while sitting in front of the screen, studying from any digital screens causes blurred vision 42.9%, double vision 31.8%. Around all of them have some of the symptoms like dry eyes, shoulder and neck pain, eye strain, double and blurred vision, were using the computer for more than 6 hours in a day<sup>22</sup> Among extra ocular symptoms headache (72.4%)

was found to be the most common in a study that was conducted in Islamabad<sup>23</sup>. In one of the study that was conducted in Karachi reports that headache (38%) was one of the most common symptoms in students<sup>5</sup>. While this study also shows that the number of students that suffered from headache were 67.9%, this extra ocular symptom was in accordance with our study. In previous studies researchers stated that the most commonly reported complaint was headache (54.5%), followed by pain (33.9%.) whereas, the least common complaint was double vision (3.6%)<sup>24</sup>. One of the previous study that was conducted in 2018 reported that eye related problems such as dry or watery eyes, redness, strain along with headache and shoulder stiffness are commonly present. As in this study around 61% students had complained for CVS.<sup>12</sup> This study revealed that the students spending around 4-7 hours in front of computer screens while some respondent spending around 7-10 hours screening time. A study conducted in 2019 shown students consuming more than 3 hours in front of their computer were suffered in computer visionary syndrome.<sup>8</sup> Another study's results showing that increase in intra ocular pressure was reported in person who use the more than a 4 hours.<sup>13</sup> 88.5% student in this study was used mobile phone more frequently for their studies and also for other purpose. The total prevalence rate of Computer visionary Syndrome was high among the students. Furthermore the ratio between male and female found that the female population was significantly more affected than the male students. One of the previous studies shows that the high prevalence rate in female population<sup>24-27</sup>. Human eyes need to adjust themselves in order to see objects from different distances, such as by changing the size of pupil, lengthening or shortening the lens to change eye focus, and contracting extra-ocular muscles to coordinate between two eyes. If computer users need to view computer screen while looking at a paper on the table from time to time, the eyes have to adjust constantly. In addition, the words and images on a computer screen are difficult for the eyes to focus on due to their poor edge resolution. The eyes tend to change the focus to a resting point and then refocus on the screen. For these reasons, constant focusing and refocusing is required. These constant changes take place thousands of times a day when a computer user stares at a computer screen for hours, which then stresses the eye muscles leading to eye fatigue and discomfort causing headache. Study was limited due to shortage of time. The sample was taken from specific population of students of one university only. Hence it may not depict the whole population of a country. Also, small number of sample was collected which may affect the presence of CVS among students.

### CONCLUSION

This study concludes that computer vision syndrome is present among under graduate Physical Therapy student with the prevalence of 60.8%. A majority of students face multiple ocular and extra ocular problems that can lead to CVS. There is an emerging need of visual rehabilitation as well as life style management along with screen time guideline for healthy ocular function and visual processing.

### REFERENCES

- [1] Khalaj M, Ebrahimi M, Shojai P, Bagherzadeh R, Sadeghi T, Ghalenoei M. Computer vision syndrome in eleven to eighteen-year-old students in Qazvin. *Biotechnology and Health Sciences*. 2015 Aug 24.
- [2] Sheppard AL, Wolffsohn JS. Digital eye strain: prevalence, measurement and amelioration. *BMJ open ophthalmology*. 2018 Apr 1;3(1):e000146.
- [3] Parveen N, Hassan SH, Rehman J, Shoukat U. Prevalence of myopia and its associated risk factors in local medical students. *Cell*. 2015 Oct;334:3887822.
- [4] Ranasinghe P, Wathurapatha WS, Perera YS, Lamabadiusuriya DA, Kulatunga S, Jayawardana N, Katulanda P. Computer vision syndrome among computer office workers in a developing country: an evaluation of prevalence and risk factors. *BMC research notes*. 2016 Dec;9(1):1-9.

- [5] Noreen K, Batool Z, Fatima T, Zamir T. Prevalence of computer vision syndrome and its associated risk factors among under graduate medical students of urban karachi. *Pakistan Journal of Ophthalmology*. 2016 Sep 30;32(3).
- [6] I Rashidi SH, Alhumaidan H. Computer vision syndrome prevalence, knowledge and associated factors among
- [7] Saudi Arabia University Students: Is it a serious problem?. *International journal of health sciences*. 2017 Nov;11(5):17.
- [8] Mansoori N, Qamar N, Mubeen SM. Dry Eye Syndrome and Associated Risk Factors among Computer Users in Karachi, Pakistan. *ANNALS OF ABBASI SHAHEED HOSPITAL AND KARACHI MEDICAL & DENTAL COLLEGE*. 2017 Sep 30;22(3):165-70.
- [9] Muma S, Aduda DO, Onyango P. Level of Awareness, Perception And Uptake Of Interventions For Computer Vision Syndrome Among University Students, Maseno, Western Kenya..
- [10] Mowatt L, Gordon C, Santosh AB, Jones T. Computer vision syndrome and ergonomic practices among undergraduate university students. *International journal of clinical practice*. 2018 Jan;72(1):e13035.
- [11] Jahan F, ul Islam Z, Rafei M. Factors Leading Computer Vision Syndrome in Medical Students: A Descriptive Analysis.
- [12] Lurati AR. Computer vision syndrome: Implications for the occupational health nurse. *Workplace health & safety*. 2018 Feb;66(2):56-60.
- [13] Qudsiya SM, Khatoon F, Khader AA, Ali MA, Hazari MA, Sultana F, Farheen A. Study of intraocular pressure among individuals working on computer screens for long hours: Effect of exposure to computer screens on IOP. *Annals of Medical Physiology*. 2017 Apr 11;1(1):22-5.
- [14] Iqbal M, El-Massry A, Elagouz M, Elzembely H. Computer vision syndrome survey among the medical students in Sohag University Hospital, Egypt. *Ophthalmology Research: An International Journal*. 2018 Jan 5:1-8.
- [15] Memon QA, Hassan MY. Detecting Computer Vision Syndrome Using Eye Blink—An Experimental Evaluation. In *Journal of Physics: Conference Series 2018 Sep 1 (Vol. 1098, No. 1, p. 012029)*. IOP Publishing.
- [16] Priya DB, Jotheeswaran J, Subramaniyam M. Visual Flow on Eye-Activity and Application of Learning Techniques for Visual Fatigue Analysis. In *IOP Conference Series: Materials Science and Engineering 2020 Aug 1 (Vol. 912, No. 6, p. 062066)*. IOP Publishing.
- [17] Portello JK, Rosenfield M, Bababekova Y, Estrada JM, Leon A. Computer-related visual symptoms in office workers. *Ophthalmic and Physiological Optics*. 2012 Sep;32(5):375-82
- [18] Ranganatha SC, Jaikhani S. Prevalence and associated risk factors of computer vision syndrome among the computer science students of an engineering college of Bengaluru—a cross-sectional study. *Galore Int J Health Sci Res*. 2019;4(3):10-5.
- [19] Reddy SC, Low CK, Lim YP, Low LL, Mardina F, Nursaleha MP. Computer vision syndrome: a study of knowledge and practices in university students. *Nepalese journal of Ophthalmology*. 2013 Sep 23;5(2):161-8.
- [20] (turgut, 2018)Turgut, B., 2018. Ocular Ergonomics for the Computer Vision Syndrome. *Journal of Eye and Vision*, 1(1).
- [21] Logaraj M, Madhupriya V, Hegde SK. Computer vision syndrome and associated factors among medical and engineering students in Chennai. *Annals of medical and health sciences research*. 2014;4(2):179-85.
- [22] Humayun S. The frequency of symptoms of computer vision syndrome among medical college students in Islamabad. *The Professional Medical Journal*. 2020 Sep 10;27(09):1823-8.
- [23] Thilakarathne MM, Udara HM, Thucyanthan B, Ranasinghe P. Prolonged computer use and its effects on vision among undergraduates in University of Colombo, School of Computing.

- [24] Dry Eye Assessment and Management Study Research Group. N- 3 fatty acid supplementation for the treatment of dry eye disease. *New England Journal of Medicine*. 2018 May 3;378(18):1681-90.
- [25] Akinbinu TR, Mashalla YJ. Impact of computer technology on health: Computer Vision Syndrome (CVS). *Medical Practice and Reviews*. 2014 Nov;5(3):20-30..
- [26] Amalia H. Computer vision syndrome. *Jurnal Biomedika dan Kesehatan*. 2018 Sep 27;1(2):117-8.
- [27] Aldawsari SA, Alotaibi AA, Alabdulwahhab KM, Mohamed EY, Abdelmajid S. Knowledge, attitudes and practices of faculty members' about computer vision syndrome, Majmaah University, Saudi Arabia. *International Journal of Community Medicine and Public Health*. 2018 Sep;5(9):3801.



© *Pakistan Journal of Rehabilitation*. This article is published under the terms of the Creative Commons Attribution 4.0 International License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author(s) and source are properly cited. Creative Commons Attribution License ([CC BY 4.0](https://creativecommons.org/licenses/by/4.0/))