

ORIGINAL ARTICLE

Frequency of computer vision syndrome and its association with forward head posture among physical therapy; an analytical cross-sectional studyGhazanfar Ullah¹, Mohammad Nasr Ul Haq², Abdul Aziz², Husna Riaz², Kashmala Khan², Musa Mujib²**Abstract**

Background: The rapid spread of digital technologies in the modern world has changed education, communication, and healthcare, making screens a necessary part of daily life. The increasing incidence of Computer Vision Syndrome (CVS) is a significant concern that negatively impacts the health of numerous people especially university students who engage in prolonged screen time for both academic and recreational purposes and therefore requires urgent attention. This study was designed to find out the frequency of computer vision syndrome and its association with forward head posture.

Material and methods: An analytical cross-sectional study comprising 153 physical therapy students of RCRS comprising a population of 251 students was conducted at RCRS. The sampling technique used was probability, i.e. simple random sampling. The CVS smart questionnaire and a goniometer were used as tools to find the frequency of CVS and FHP. With permission obtained priorly and data collected, SPSS was used for data analysis.

Results: A total of 84 participants out of 153 (84%) had CVS. 123 (80%) participants had forward head posture. A significant association was established between CVS and CVA (P value 0.000), CVS and screen usage duration (P value 0.003) as well as CVS and Semester (P value 0.039).

Conclusion: The frequency of CVS and FHP was found among the physical therapy students. A significant association was established between increased duration of screen usage and CVS.

Keywords: Computer Vision Syndrome, Physical Therapy, Forward Head Posture.

Author's Affiliation

¹Assistant Professor, In-Charge Physical Therapist, Rehman College of Rehabilitation Sciences, RMI, Peshawar

²Rehman College of Rehabilitation Sciences, RMI, Peshawar

Corresponding Author

Ghazanfar Ullah

Assistant Professor, In-Charge Physical Therapist, Rehman College of Rehabilitation Sciences, RMI, Peshawar

Email: ghazanfarkhan920@gmail.com

Contact #: 03339076837

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INTRODUCTION

The rapid spread of digital technologies in the modern world has changed education, communication, and healthcare, making screens a necessary part of daily life.¹ The increasing incidence of Computer Vision Syndrome (CVS) is a significant concern that negatively impacts the health of numerous people especially university students who engage in prolonged screen time for both academic and recreational purposes and therefore requires urgent attention.

Computer Vision Syndrome (CVS) is defined by the American Optometric Association (AOA) as a collection of eye-related issues that come from using screens for a long time, such as those seen on cell phones, laptops, tablets, and e-readers.² This condition, characterized by symptoms such as eye strain,

blurred vision, and headaches, is often exacerbated by prolonged computer use.³

Inappropriate distance of use, inadequate lighting in the work place, brightness and/or screen brightness, vision issues, contact lens use, improper workspace arrangement, hours of use, and poor posture during use are all contributory factors for computer vision syndrome occurrence, according to numerous research.⁴ A systematic review indicates that the use of digital devices, including computers, for as little as 3 hours per day can lead to the development of CVS.⁵

Prolonged computer use is also associated with musculoskeletal problems, including neck pain and headaches, which are often linked to poor ergonomic practices such as forward head posture (FHP).⁶ The anterior position of the head in relation to the

shoulders is a frequent postural aberration known as Forward Head Posture (FHP). Also referred to as "text neck," "scholar's neck," "wearies neck," or "reading neck."⁷

Adults with forward head posture have a high incidence of spinal postural deviations, with shoulder position and other postural deviations being among the most widespread.⁸ This misalignment can lead to increased strain on the muscles, joints, and ligaments of the cervical spine and upper back, contributing to conditions such as muscle pain, and fatigue, as well as decreased range of motion in the cervical spine.⁹ Subsequent effects of forward head posture also include vision and hearing impairments caused by the misalignment of the auditory meatus, as well as the possibility of spine degeneration or disc herniation if the condition is chronic.¹⁰

This posture intensifies Computer Vision Syndrome (CVS) symptoms and contributes to neck and upper back pain, significantly affecting overall well-being.¹¹ It can also cause symptoms like vertebrobasilar insufficiency, cervicogenic dizziness, head and facial pain, nerve irritation, and cervical radiculopathy.⁸

The occurrence of CVS in individuals who use computers falls between 64% and 90%, with approximately 60 million people affected globally and nearly one million new cases emerging annually.¹² Regionally, Africa had the highest prevalence at 71.2%, followed by Asia (69.9%), Latin America (66.6%), and Europe (61.4%).⁵ Gender differences were observed, with women experiencing CVS at a higher rate (71.4%) compared to men (61.8%), and university students showing a notably high prevalence of 76.1%.⁵

Pavel et al. (2022) conducted a cross-sectional study in Europe and found that 73.3% of students had dry eyes, 68.9% had blurred vision, and 65.2% had pain in their neck, shoulders, and back. These symptoms were recognized as the predominant problems linked to the utilization of digital devices. The study also found that most of the people who took part in it had at least one symptom of Computer Vision Syndrome (CVS).¹³

Regarding forward head posture, a 2022 cross-sectional study in India found that 70% of physiotherapy students had this postural issue.¹⁴ In 2019, a cross-sectional study

conducted by Mamania et al. at a physical therapy college in the South Asia region, revealed that 70% of physiotherapy students exhibited Forward Head Posture (FHP). The research underscored that the substantial time students dedicated to using laptops, mobile phones, and studying from books likely played a significant role in the high prevalence of this postural issue.¹⁵

A 2024 study among undergraduate IT students indicated a potential link between CVS and forward head posture. It showed that students with CVS tended to have a smaller craniovertebral angle (CVA), suggesting forward head posture.¹¹

A cross-sectional study conducted in 2023 at Majmaah University in the Middle East region revealed that the most prevalent visual conditions were nearsightedness (38.0%) and dry/itchy eyes (49.0%). Additionally, neck pain was reported by 79.5% of students, while visual abnormalities were common in 62.0% of the student population. Notably, students experiencing neck discomfort had a higher prevalence of visual problems compared to those without neck pain (82.2% vs. 75.5%). These findings underscore the significant impact of prolonged screen use on both visual and musculoskeletal health among university students.¹⁶

Computer Vision Syndrome (CVS) is prevalent among students due to prolonged screen time. Given their future role in healthcare and exposure to prolonged screen use, physiotherapy students are an important population to study. Untreated Computer Vision Syndrome (CVS) can lead to visual discomfort, headaches, and musculoskeletal issues, with Forward Head Posture (FHP). These issues can negatively impact both the well-being and academic performance of physiotherapy students. Considering the limited number of studies in this field, this study aims to assess the relationship between CVS and FHP to highlight the need for preventive strategies. The findings will help promote better eye care, posture correction, and overall health awareness.

MATERIAL AND METHODS

The study was conducted at Rehman College Of Rehabilitation Science Hayatabad Peshawar (DPT) and spanned over a period of 6 months i.e. from March 2025 to August 2025. An analytical cross-sectional design

was implemented. The sampling technique used was probability (Systematic random sampling). Calculated using OpenEpi at a 95% confidence interval, the sample size was 153. The participants included were undergraduate physical therapy students and those who gave informed consent. Individuals having any history of cervical fracture, spinal deformity e.g. scoliosis as well as any history of ophthalmic surgery or active condition were excluded. Data was collected after the approval of the proposal from the Graduate Study Committee of RCRS.

Computer Vision Syndrome Questionnaire: CVS was diagnosed using the CVS Smart Questionnaire, a validated tool assessing symptom severity. A score of 5-6 and 7-10 on the questionnaire indicated a positive diagnosis of CVS. The CVS questionnaire had a validity of 0.83 and a reliability of 0.86 (Cronbach alpha). It consists of five questions, each exploring different components related to CVS symptoms. Every question has a score between 0 and 2, with 0 denoting no symptoms and 2 denoting the presence of two or more symptoms.

Standard Goniometer: Using a goniometer, the cranio-vertebral angle was measured to determine whether forward head posture was present. The participant's forward head posture was indicated by an angle of less than 50°.

RESULTS

The study included 153 undergraduate students with a mean age of 21.37 years (SD =1.87). The sample comprised 43 males

(28.1%) and 110 females (71.9%) (table-I for further demographic details). The duration spent on computers by the participants in a single day varied significantly. More than eight hours a day were spent on computers by nearly half of the participants (n = 75, 49.0%). The participants were divided into categories based on the likelihood of suffering from CVS. 64 participants were present in the categories positive and High probability. The category with the least number of participants was Normal i.e. 2%. Regarding the frequency of Forward head posture, most of our participants were in the MILD category (97, 63%). A total of 30 participants had a normal posture (20%), while 26 were in the category severe (17%). The frequency of forward head posture turned out to be 80%. A highly significant association between the primary variables, i.e., CVS and CVA existed, so the null hypothesis was rejected (table-II). The association between CVS and secondary variables was found using a chi-square test. A strong association was found between CVS and duration (P value 0.003). This strong association reveals that the duration (screen time) may have an impact on the development of CVS. This leads us to the conclusion that students who have higher screen time have a greater likelihood of developing Computer Vision Syndrome. An association was also found between Semester and CVS. Regarding gender, we did not find any association between it and CVS (P value 0.069) (table-III).

Table-I: Demographics details of the included participants

Variables	Categories	Frequency	Percentages
Gender	Male	43	28.1
	Female	110	71.9
Semester	1st Semester	47	30.7
	3rd Semester	27	17.6
	5th Semester	25	16.3
	7th Semester	32	20.9
	9th Semester	22	14.4

Table-II: CVS and CVA Association

Association Between Primary Variables	Chi-Square Tests	Df	P-value
Computer Vision Syndrome Cranio-vertebral Angle	38.302 ^a	8	P <0.001

Table-III: Association between Secondary Variables

Association Between Secondary Variables	Chi-Square Tests	Df	P-value
Screen duration usage CVS	35.978 ^a	16	.003
Gender CVS	8.705 ^a	4	.069
Semester CVS	27.245 ^a	16	.039

DISCUSSION

The sample size of the study conducted was 153 in which 110 participants were females, comprising 71.9% of the sample size while males were 43 in number with a percentage of 28.1%. The frequency of computer vision syndrome (CVS) found among the participants of our study was 64 participants (42%) falling under the categories of CVS-Positive and (42%) under High probability, the conclusion of both categories combined indicates a high frequency of CVS. The results coincide with those of Noonari et al. 2024, which state that 88% of the participants had CVS.¹¹ A similar study in Sri Lanka concluded that CVS was present in 67.4% of the population in the study. However, a study conducted in Tabuk, Saudi Arabia, reported the prevalence of CVS much less than our study i.e., only 33.8% of the participants had CVS. Similarly, another study on medical students in Sudan reported the prevalence of CVS to be 31%.¹⁷ The increased frequency of CVS reported in our study aligns with the fact that technology (screens in this case) is a continuous part of the daily lives of physical therapy students, such as taking at least 6 hours of lectures on a projector screen, which leads to increased screen exposure in addition to using their cell phones, laptops, TV, etc. The advancement of digitalization of teaching methodology as well as the adaptation of eBooks/ PowerPoint presentations for studying, are factors that contribute significantly to increasing the frequency of CVS. Students use social media in their free time for leisure and relaxation, along with a sedentary lifestyle, thus further becoming a victim of CVS.

Regarding Forward Head Posture (FHP), our study revealed that 80% of our study population had FHP. The majority of our participants (63%) lay in the MILD FHP category, while 17% were in the SEVERE FHP category. A mere 20% had a normal craniovertebral angle. Most of the studies have shown high FHP, with the lowest frequency in the literature up to 60%. A study conducted by Kainat Bibi et al in Pakistan found the prevalence of FHP to be 84%, which is in line with our findings.⁽¹⁸⁾ Another study by Shivani Goswami et al found the prevalence of FHP as 70%.¹⁴ On the contrary,

Ayesha Saeed et al reported 62.1% prevalence of FHP in their study.¹⁹

Students having FHP is mostly a consequence of poor posture. This is a consequence of adaptation of poor ergonomics due to prolonged exposure to screens. This resultantly leads to the shortening of the anterior ligaments of the neck, forcing the head to protrude forward in relation to the shoulders, the consequence of which is FHP. Students tend to take less breaks (at times no breaks at all) during study sessions.

The main objective of our study was to determine whether an association exists between CVS and FHP. An association was found between CVS and FHP (P value of 0.003). This is parallel to the result obtained by M.H. Noonari et al who concluded that a highly significant association exists between CVS and FHP (P value of 0.01).¹¹ A cross-sectional study investigating the relationship between CVS and ergonomic factors found a significant association between CVS and non-neutral neck postures (P value 0.045).²⁰ Sustained visual attention not only contributes to CVS but it also disrupts normal biomechanics of cervical spine which secondarily adds to forward head posture. This occurs with the static forward leaning of head in compensation to the visual demands. The constant neck flexion overloads the neck muscles followed by the accommodative anterior translation of head due to its weight, elicited with the change in center of gravity from normal line to the anterior direction. Excessive interaction with smart phones, computers, or other digital devices influences the spine to deviate from its normal alignment in compliance with the tendency for capturing a clear sight of the screen. This explains the greater prevalence of FHP among individuals with high rates of screen exposure.

Regarding the association between CVS and screen time, we found a highly significant association between the two variables (P Value 0.003). Majority of the studies align with our result such as that of Thapar et al, who found a strong correlation between screen time and CVS with a P value of 0.005).²¹ Putra et al in their study found that increased duration of smartphone led to more eye strain complaints (P value 0.001).²² On the contrary, a study conducted in Ludhiana

India, found no significant increase in CVS cases with increased screen time.²³ A number of reasons can perhaps be attributed to the increased frequency of CVS due to increased screen time such as the use of smartphones in a dark room. The increased absorption of blue light from screens for long hours, particularly from older devices which do not have blue light filters, the use of small fonts are reasons that contribute to the development of CVS due to prolonged screen time.

The present study demonstrated no significant link between screen time and gender, along with its variations in frequency across academic semesters. These findings correlate with the results of Walailak University, Thailand, which suggested no significant correlation between screen time and study levels ($p > 0.05$).²⁴ The similar access of both genders for academic or recreational purposes consequently led to an equal usage of digital platforms, causing no prevalent change amongst males and females. Moreover, uniformity is present in the academic requirements for ebooks, online lectures, and assignments across all semesters. These factors are consequential to producing the same results.

However, other studies, such as one on high school students in China (Cui, Z. et al., 2023), reported that male gender had greater rates of excessive screen time use than the female population (15.3% vs. 3.5%; $p < 0.001$).²⁵ Another study conducted among Bangladeshi university students indicated male population spent more time on social media through screens as compared to females ($p < 0.001$).²⁶ This ratio is influenced by the greater involvement of the male gender in gaming, online streaming, and online working platforms. On the contrary, more females were reported to have higher screen viewing than males in a study.²⁷

When considering CVS with semesters, we found that the 1st semester students (or students in 1st year of study) had a higher frequency of CVS as compared to the higher semesters. This is in line with a study conducted by Sengo et al, who also found CVS to be higher in 1st year students.⁽⁴⁾ However, in Chinese High school students in Henan province, a decline in screen time usage was noted in second and third year students, while a surge was seen in the

remaining years.²⁵ In contrast, Al Muqrashi et al, did not find any association between years of study and CVS.²⁸ A reason for this can be the transition from higher secondary schooling to university life, which increased the workload.

CONCLUSION

Inferring to the results of our study, we conclude that the frequency of CVS is high among the DPT students of RCRS. The frequency of FHP was also high. Students with CVS also exhibited FHP, thus a highly significant association was found between the two variables. Furthermore, students who had a higher screen time depicted a greater percentage of having CVS, also showing a high significance. No association of CVS was found with gender.

RECOMMENDATIONS:

A study with a longitudinal study design shall enhance the precision of the research. Larger sample sizes should be used in future research. Students from multiple institutes shall be recruited for future research.

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