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Impact of Computer Vision Syndrome on the Quality of Life of Office Workers

[1]Eliza Awais[a], [2]Samara Shaukat[a], [3]Iqra Ejaz[a], [4]Muhammad Abubaker Tariq[a], [5]Saboor Naveed[a], [6]Iqra Ikram[b]
[a]Afro-Asian Institute, Lahore, Pakistan
[b]Physiotherapist, Zafar Memorial Hospital, Lahore, Pakistan

ABSTRACT

Background: With the widespread use of digital devices in office settings, computer vision syndrome (CVS) has emerged as a common occupational health concern, potentially affecting workers' physical and mental well-being.

Objective: To determine the impact of computer vision syndrome on the quality of life among office workers in Lahore, Pakistan.

Methods: A cross-sectional study was conducted among 166 office workers selected through purposive sampling. Participants aged 15–50 years, using computers for at least 6 hours daily for a minimum of six months, were included. Data were collected using the Computer Vision Syndrome Questionnaire (CVS-Q) and the SF-36 Health Survey. SPSS version 25 was used for data analysis. Frequencies, percentages, means, and cross-tabulations were reported, and chi-square tests were applied to assess associations.

Results: Among participants, 43.4% had severe CVS, 39.2% moderate, and 17.5% mild. Most reported poor physical functioning (99.4%) and limitations in role-physical domains (91.6%). Despite severe symptoms, 48.2% reported above-average mental health and 34.3% excellent emotional role functioning.

Conclusion: Computer Vision Syndrome (CVS) significantly affects the physical health of office workers but has a comparatively lesser impact on mental and emotional domains. Ergonomic interventions and digital hygiene practices are essential to improve quality of life.

Keywords: Computer Vision Syndrome, Eye Strain, Occupational Health, Office Workers, Quality of Life, Visual Ergonomics.

Correspondence
Iqra Ikram | iqraikram002@gmail.com

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Introduction

The Computer Vision Syndrome (CVS) has become a growing concern in modern workplaces, particularly as digital technology continues to dominate professional environments. The condition is increasingly recognized as a significant source of discomfort and reduced productivity among office workers (1). The global prevalence of CVS reflects the growing dependence on digital devices, with a wide range of symptoms impacting individuals who engage in prolonged screen usage, such as eye strain, headaches, blurred vision, dry eyes, neck and shoulder pain, and general ocular discomfort (2). The rise in screen time, particularly due to shifts in work culture and remote working during the COVID-19 pandemic, has led to a surge in CVS cases. Workers now spend extended periods in front of screens for professional tasks, virtual meetings, and even leisure activities, which have amplified the risk of developing CVS (3).

Estimates suggest that between 75% and 90% of computer users are affected by CVS, with approximately 60 million individuals worldwide experiencing symptoms (4). This condition is not limited to older adults; younger individuals, including those in their 20s and 30s, are increasingly seeking medical advice for computer-related eye issues (5). The widespread availability and use of digital devices have made CVS a global health concern, affecting people of all ages. While developed nations have witnessed an explosion in digital device usage, low-income countries face additional challenges due to inadequate ergonomic practices and limited access to protective equipment (6). The rise in CVS cases can be attributed to various factors, including increased screen time, improper posture, poor lighting, and the lack of proper eye care (7).

The long-term effects of computer usage, particularly the associated visual impairments, have been well documented. Studies have shown that prolonged exposure to screens can lead to a range of visual disturbances, including asthenopia (eye fatigue), dryness, and discomfort in the ocular surface, all of which are key symptoms of CVS (8). Moreover, the frequent and continuous use of digital devices can lead to musculoskeletal symptoms, such as neck and back pain, further compounding the impact on individuals' health (9). As computers and digital technology continue to be integrated into almost every aspect of life, the prevalence of CVS is expected to rise, making it a significant issue in both public health and workplace productivity (10).

The failure to address CVS symptoms in a timely manner can lead to a decline in workers' quality of life and overall job satisfaction, as well as increased absenteeism due to related health problems. Its defining characteristics are constant ocular, visual, and musculoskeletal symptoms, including asthenopia, ocular surface changes, and visual and extra-ocular domains (11). If left untreated, CVS can severely impact an individual's ability to perform their work tasks efficiently and effectively, ultimately leading to a decrease in productivity (12). The condition's impact extends beyond the workplace, affecting daily activities and general well-being, which highlights the need for early intervention and preventive measures. Additionally, improper blinking patterns associated with prolonged screen use—such as incomplete blinking and reduced tear film stability—further contribute to dry eye disease and exacerbate CVS symptoms (13).

Given the significance of these health implications, raising awareness about the risk factors and providing guidance on ergonomic work practices are essential steps in mitigating the effects of CVS. It is vital to educate office workers on the importance of regular breaks, proper screen positioning, and the use of appropriate lighting to reduce the strain on their eyes and muscles (14). This study aims to examine the prevalence of CVS among office workers in Lahore, focusing on the impact it has on their productivity, quality of life, and overall health. By investigating the underlying causes and associated risk factors, the study underscores the necessity of preventive measures to safeguard workers health and enhance workplace productivity. Through this, it is hoped that a deeper understanding of CVS will lead to the implementation of practical solutions that improve the well-being of office workers.

Materials and Methods

A cross-sectional study was conducted in private offices in Lahore, Pakistan, to assess the impact of Computer Vision Syndrome (CVS) on the quality of life among office workers. The research was carried out over a period of six months. The sample size was calculated to be 166 participants using the Cochrane formula for sample size determination. A purposive sampling technique was employed to select participants who met the inclusion criteria. These criteria consisted of office workers aged 15 to 50 years, of both genders, who used computers for at least six hours per day and had been doing so for a minimum of six months (15).

Exclusion criteria included individuals with pre-existing eye conditions unrelated to CVS, such as glaucoma, cataracts, and macular degeneration. Additionally, participants who were taking medications that could potentially affect vision or induce symptoms similar to CVS, such as antihistamines or antidepressants, were excluded (16). Those with neurological disorders that could influence visual symptoms were also not included in the study (17).

Data was collected using a Computer Vision Syndrome Questionnaire (CVS-Q) (18), which assesses the presence and severity of CVS symptoms, and the Short Form-36 (SF-36) questionnaire (19), a standardized tool for evaluating the quality of life across various domains. Both

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instruments were administered to participants in a structured manner, and responses were recorded for analysis.

The collected data were analyzed using SPSS version 25, and the results were presented in the form of frequency and percentage tables to summarize the demographic information and prevalence of symptoms associated with CVS. Statistical significance was determined based on the P-value, with a value of less than 0.05 considered significant. Ethical approval for the study was obtained from the institutional review board (IRB) of the relevant institutions. All participants provided informed consent before taking part in the study, ensuring their voluntary participation and confidentiality.

Results

The results of the study revealed that the average age of participants was 28.14 years (SD = 9.09), indicating a predominantly young adult population. Gender distribution was nearly equal, with 52.4% males and 47.6% females. Regarding screen usage, 50% of the respondents reported using computers for approximately 6 hours per day, 13.3% for 7 to 10 hours, and 36.7% for more than 10 hours daily. This indicates a high prevalence of prolonged screen exposure among the participants. In terms of symptom assessment, the mean frequency of CVS symptoms was 32.67 (SD = 14.56), and the mean intensity of symptoms was 23.23 (SD = 7.99), highlighting a substantial burden of CVS-related discomfort in this office-working population.

Table 1: Frequency and Percentages of Computer Vision Syndrome and SF-36

Variable	Construct	Frequency	Percentage
CVS-Q Total Score	Mild	29	17.5
	Moderate	65	39.2
	Severe	72	43.4
Physical Functioning (PF)	Poor Health	165	99.4
	Below Average Health	1	0.6
Role-Physical (RP)	Poor Health	152	91.6
	Below Average Health	14	8.4
Bodily Pain (BP)	Poor Health	1	0.6
	Below Average Health	93	56.0
	Above Average Health	30	18.1
	Excellent Health	42	25.3
General Health (GH)	Poor Health	1	0.6
	Below Average Health	86	51.8
	Above Average Health	76	45.8
	Excellent Health	3	1.8
Vitality (VT)	Poor Health	2	1.2
	Below Average Health	93	56.0
	Above Average Health	62	37.3
	Excellent Health	9	5.4
Social Functioning (SF)	Poor Health	15	9.0
	Below Average Health	70	42.2
	Above Average Health	65	39.2
	Excellent Health	16	9.6
Mental Health (MH)	Poor Health	8	4.8
	Below Average Health	61	36.7
	Above Average Health	80	48.2
	Excellent Health	17	10.2
Role-Emotional (RE)	Poor Health	6	3.6
	Below Average Health	50	30.1
	Above Average Health	53	31.9
	Excellent Health	57	34.3

Table 2: Demographics Distribution of Participants

Variable	Construct	Frequency/Mean	Percentage/SD
Age	Mean	28.14	9.09
Gender	Male	87	52.4
	Female	79	47.6
Duration of Usage	6 Hours	83	50.0
	7-10 Hours	22	13.3
	More Than 10 Hours	61	36.7
Symptoms	Frequency of Symptoms	32.67	14.56
	Intensity of Symptoms	23.23	7.99

The analysis of symptom frequency revealed that eye strain was the most commonly reported symptom, affecting 72.5% of participants. This was followed by headaches, reported by 66.7% of respondents, and blurred vision, experienced by 54.9%. Additionally, 46.1% of participants reported dry eyes, 43.6% experienced neck or shoulder pain, and 36.2% reported difficulty focusing. These findings indicate that visual discomfort, particularly eye strain, headaches, and blurred vision, were the predominant symptoms associated with Computer Vision Syndrome (CVS) among the office workers surveyed.

Table 3: Cross Tabulation of Computer Vision Syndrome-Q and SF-36

Variable	Category	Mild	Moderate	Severe	Chi-square (χ^2)
Physical Functioning (PF)	Poor Health	29	65	71	(0.519)
	Below Average Health	0	0	1	
Role-Physical (RP)	Poor Health	18	64	70	(0.00)
	Below Average Health	11	1	2	
Bodily Pain (BP)	Poor Health	0	1	0	(0.423)
	Below Average Health	15	41	37	
	Above Average Health	4	9	17	
	Excellent Health	10	14	18	
General Health (GH)	Poor Health	0	1	0	(0.688)
	Below Average Health	14	31	41	
	Above Average Health	15	31	30	
	Excellent Health	0	2	1	
Vitality (VT)	Poor Health	0	2	0	(0.088)
	Below Average Health	19	41	33	
	Above Average Health	10	18	34	
	Excellent Health	0	4	5	
Social Functioning (SF)	Poor Health	3	5	7	(0.955)
	Below Average Health	12	29	29	
	Above Average Health	12	26	27	
	Excellent Health	2	5	9	
Role-Emotional (RE)	Poor Health	0	1	5	(0.00)
	Below Average Health	19	13	18	
	Above Average Health	6	27	20	
	Excellent Health	4	24	29	
Mental Health (MH)	Poor Health	2	3	3	(0.227)
	Below Average Health	13	28	20	
	Above Average Health	13	25	42	
	Excellent Health	1	9	7	

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The Chi-square (χ^2) test is used here to assess the relationship between the severity of Computer Vision Syndrome (CVS) symptoms—categorized as mild, moderate, and severe—and different domains of health-related quality of life as measured by the SF-36 questionnaire, including Physical Functioning (PF), Role-Physical (RP), Bodily Pain (BP), General Health (GH), Vitality (VT), Social Functioning (SF), Role-Emotional (RE), and Mental Health (MH). Each domain (e.g., PF, RP, BP) is tested for statistical significance using a Chi-square test to determine whether there is an association between that specific health domain and the severity of CVS symptoms. The χ^2 value listed in the "Chi-square (χ^2)" column indicates the result of that test for each variable. Only Role-Physical (RP) and Role-Emotional (RE) domains showed statistically significant associations with CVS severity, meaning that the ability to perform physical and emotional roles was impacted in a way that correlates strongly with how severe a person's CVS symptoms were. All other domains (PF, BP, GH, VT, SF, MH) showed no statistically significant differences, indicating a relatively stable perception of these aspects of quality of life across CVS severity levels.

Discussion

The present study supports existing evidence regarding the high prevalence and impact of Computer Vision Syndrome (CVS) among individuals with prolonged screen exposure. Quantitatively, 43.4% of the participants in our study reported severe symptoms of CVS, while 39.2% had moderate and 17.5% had mild symptoms. These figures are comparable to those reported by Logaraj et al. (2014), who found that approximately 81.9% of students experienced at least one CVS symptom, particularly associated with prolonged computer usage exceeding two hours per day (20). Similarly, in our study, 86.7% of participants reported using computers for more than six hours daily, reinforcing the correlation between screen time and CVS severity.

The gender distribution in this study was nearly balanced, with 52.4% female and 47.6% male participants. While earlier research has suggested that women may be more prone to specific CVS symptoms like dry eyes (Wolkoff, 2020), the present study found no major difference in symptom severity between genders. Both men and women reported similar levels of discomfort, with 43.4% experiencing severe symptoms, 39.2% moderate, and 17.5% mild. These findings align with those of Logaraj et al. (2014), who observed a high prevalence of CVS among individuals with prolonged screen exposure. The consistently high scores for both symptom frequency and intensity further confirm that CVS is a widespread and persistent concern among office workers (20,21). Our results are similar to what Rosenfield (2011) found, showing that long screen use can cause eye strain, headaches, and other CVS symptoms (22). Participants in our study frequently reported similar symptoms, with an average symptom frequency score of 32.67 and intensity score of 23.22, highlighting a considerable burden of ocular discomfort in this population.

Wolkoff (2020) argued that dry eye symptoms in office environments not only cause discomfort but also impair work performance (21). While our study did not measure work productivity directly, the observed 99.4% reporting poor physical functioning on the SF-36 scale suggests that CVS symptoms may substantially interfere with physical performance at work. Moreover, 91.6% of participants showed poor outcomes in the Role-Physical domain, indicating that physical limitations may extend beyond just ocular symptoms. Sánchez-Brau et al. (2020) highlighted that ergonomic and individual factors, including improper screen placement and insufficient lighting, significantly influence the severity of CVS symptoms (23). Although our study did not explore ergonomic specifics in depth, the high frequency and severity of symptoms among participants support the notion that non-visual environmental factors may contribute to the syndrome's persistence and intensity.

Interestingly, despite high physical symptomatology, many participants maintained relatively high scores in mental and emotional well-being, 48.2% had above-average mental health, and 34.3% reported excellent emotional functioning. This finding may reflect adaptive coping mechanisms as described by Sánchez-Brau et al., who noted that individuals experiencing chronic symptoms often develop psychological resilience over time (23). Thus, our study adds to the growing body of evidence indicating that while CVS is physically debilitating, its psychological toll may be mitigated through behavioral adaptation or environmental modification.

Several limitations should be considered when interpreting the findings of this study. One major limitation is the reliance on self-reported data from questionnaires, which may introduce bias, as participants might overestimate or underestimate the severity of their symptoms. Additionally, the absence of a control group of non-office workers limits the ability to generalize the results to the broader population. Moreover, the study's focus on ocular symptoms may have overlooked other aspects of quality of life affected by Computer Vision Syndrome (CVS), such as musculoskeletal pain, which is also prevalent among office workers.

To improve CVS diagnosis and management, a combination of objective eye tests and vision assessments is recommended for more accurate results than relying solely on subjective reports. Additionally, the potential benefits of innovative products like blue light-filtering glasses in alleviating CVS symptoms warrant further exploration. Future research should focus on their

effectiveness in managing symptoms and enhancing office workers' well-being. Advanced statistical methods, such as regression analysis, should also be employed to better understand the relationship between CVS symptoms and quality of life.

Conclusion

In conclusion, this study highlights that Computer Vision Syndrome (CVS) significantly impacts the physical health of office workers, with symptoms such as eye strain, headaches, and blurred vision being most prevalent. However, its influence on mental and emotional well-being appears less severe, possibly due to adaptive coping mechanisms developed over time. Promoting healthy screen habits, ergonomic practices, and awareness regarding CVS prevention may alleviate physical discomfort and enhance overall quality of life. These findings underscore the importance of integrated healthcare strategies that address both the physical and psychosocial dimensions of CVS to improve occupational health outcomes for office workers.

Authors' Contributions

ICMJE authorship criteria	Detailed contributions	Authors
Substantial Contributions	Conception or Design of the work	1,2,3,5
	Data acquisition	1,2,3,5,6
	Data analysis or interpretation	1,3,4
Drafting or Reviewing	Draft the work	6
	Review critically	1,2,3,4
Final approval	Final approval of the version to be published.	1,2,3,4,5,6
Accountable	Agreement to be accountable for all aspects of the work.	1,2,3,4,5,6

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