Journal of Health, Wellness and Community Research
ISSN: 3007, 0570

Correspondence
Wajida Perveen, wjda_noor@yahoo.com

Received 23 October 2025
Accepted 19 November 2025

Authors' Contributions
Concept: MAA, WP, HT; Design: WP, WS, SN; Data Collection: HT, SI, WS, HS; Analysis: MAA, WP, HS; Drafting: MAA, WP, SN.

Declarations
No funding was received for this study. The authors declare no conflict of interest. The study received ethical approval. All participants provided informed consent.

"Click to Cite"

JHWCR

Type: Original Article
Published: 30 November 2025
Volume: III, **Issue**: XVII
DOI: https://doi.org/10.61919/xkzccb27

Prevalence of Computer Vision Syndrome Amid Extensive Screen Time During COVID-19 in Young Adults

Misbah Amanat Ali[1], Sadida Nisar[1], Hamna Tanveer[1], Huma Shakeel[1], Wajida Perveen[2], Wajeeha Siddique[1], Shanza Iqbal[1]

1 Department of Physical Therapy, Sialkot College of Physical Therapy, Amin Welfare & Teaching Hospital, Sialkot, Pakistan
2 Department of Physical Therapy, School of Allied Health Sciences, CMH LMC & IOD (NUMS), Lahore, Pakistan

ABSTRACT

Background: *Computer Vision Syndrome (CVS) has become increasingly prevalent due to accelerated digitalisation during the COVID-19 lockdown, with young adults representing a particularly vulnerable population because of prolonged near-work demands and extensive reliance on digital devices. Objective: To determine the prevalence and severity of CVS among young adults during the COVID-19 lockdown and to examine the distribution of CVS-related symptoms across screen-time categories using the validated Computer Vision Syndrome Questionnaire (CVS-Q). Methods: A cross-sectional observational study was conducted among 550 university students and teachers aged 18–30 years in Sialkot, Pakistan. Data on demographics, device-use patterns and symptom frequency and intensity were collected using a structured online survey incorporating the CVS-Q. CVS was defined as a total score ≥6. Statistical analyses included chi-square tests, odds ratios and confidence intervals to evaluate associations with gender and screen time. Results: The prevalence of CVS was 62.7%, with 46.2% exhibiting mild, 13.6% moderate and 2.9% severe symptoms. Headache was the most burdensome symptom (mean score 1.54 ± 1.24). CVS prevalence increased markedly with longer screen exposure, rising from 36.2% in participants using screens 1–2 hours daily to 81.2% among those using screens 16–20 hours (p<0.001). Females had significantly higher odds of CVS than males (OR 1.52, p=0.022). Conclusion: CVS was highly prevalent among young adults during the COVID-19 lockdown, demonstrating a clear dose–response relationship with screen time and highlighting the need for targeted preventive strategies in academic settings.*

Keywords
Computer Vision Syndrome; Digital Eye Strain; COVID-19; Screen Time; Young Adults; CVS-Q

INTRODUCTION

Computer Vision Syndrome (CVS), also referred to as digital eye strain, has emerged as a common ophthalmic consequence of prolonged exposure to digital screens in modern work, education and leisure environments (1). It represents a constellation of ocular and visual symptoms—such as eye strain, burning, dryness, blurred vision and headache—arising from sustained near work on electronic devices and is now recognised as an occupational and public health concern in multiple populations (1,2). The American Optometric Association and visual ergonomics experts describe CVS as a group of eye and vision problems related to activities that stress near vision, typically occurring during or after the use of computers and other digital devices, and influenced by task demands, viewing distances, environmental illumination and individual visual status (2,3). Mechanistically, sustained accommodation and convergence, reduced blink rate, increased tear film evaporation, uncorrected refractive errors and suboptimal ergonomics have all been implicated in the development of CVS, while symptoms may significantly reduce productivity, comfort and quality of life in both occupational and academic settings (1,3,4).

Ocular surface changes, particularly evaporative dry eye, play a central role in CVS pathophysiology. Prolonged screen viewing is associated with decreased blink frequency and increased incomplete blinks, which destabilise the tear film, promote ocular surface desiccation and trigger symptoms such as burning, itching, foreign body sensation and photophobia (1,4). Individuals with pre-existing tear film instability or ocular surface disease may therefore be particularly vulnerable to CVS in the context of intensive digital device use (4). Contact lens wearers represent another at-risk group, as contact lenses can exacerbate dryness, increase awareness of ocular discomfort and potentiate digital eye strain when worn for extended periods during screen-based tasks (5). Furthermore, the widespread adoption of smartphones and tablets, with their small screens, close viewing distances and high-resolution displays, has intensified near visual demands and contributed to the rising prevalence and severity of CVS in both younger and older users (6).

Before the COVID-19 pandemic, multiple studies had already documented a high burden of CVS in diverse occupational and academic groups exposed to digital devices for prolonged hours. Among bank workers in Ethiopia, CVS prevalence was reported at approximately three-quarters of computer users, with blurred vision, headache and ocular redness among the most common complaints (7). Similar findings were reported in Indian medical and engineering students, where more than three-quarters of participants experienced CVS, highlighting the vulnerability of students engaged in intensive screen-based learning and study activities (8). Recent European data from office workers further confirmed high

CVS prevalence and identified intensive digital device use (>6 hours/day) as a key risk factor, particularly when combined with optical correction and suboptimal visual ergonomics (9). In healthcare workers using video display terminals, more than half were found to have CVS, with nurses representing the most affected group, again underlining the occupational relevance of this condition (10).

Beyond adults in employment, adolescents and young people have also been shown to experience digital eye strain in association with increasing daily screen hours. In Pakistani teenagers, a cross-sectional survey demonstrated a significant relationship between daily screen time and digital eye strain, with headache reported as one of the most frequent symptoms (11). These findings are concerning in the context of rapidly expanding digitalisation of education and entertainment, as early-life exposure to prolonged screen use may establish symptom patterns that persist into adulthood and potentially interact with emerging refractive errors and lifestyle behaviours (6,11).

The COVID-19 pandemic and associated lockdowns further amplified these concerns by abruptly shifting educational, occupational and social activities onto digital platforms. Lockdown measures confined individuals to their homes, increased reliance on online learning and remote work, and led to marked increases in daily screen time across age groups (12). Studies from South Africa and India reported substantial rises in digital device use and associated ocular complaints during lockdown, with many participants acknowledging a clear temporal link between the start of home confinement and the onset or worsening of eye strain, headache and dryness (12,13). Among undergraduate medical students in Pakistan, almost all respondents reported at least one CVS symptom during COVID-19, with ocular and extra-ocular complaints both highly prevalent (14). Similarly, research among Pakistani video gamers during the first national lockdown demonstrated high rates of digital eye strain, with tired eyes and musculoskeletal symptoms commonly reported, reflecting coexisting visual and postural stressors (15). More recently, CVS and digital eye strain have also been described among physicians and other doctors in Pakistan, where longer daily screen times were significantly associated with CVS, underscoring that even medically aware populations are not spared from this problem (16).

Accurate estimation of CVS prevalence and severity in different populations requires the use of validated instruments with robust psychometric properties and clearly defined scoring algorithms. The Computer Vision Syndrome Questionnaire (CVS-Q) is a 16-item scale that assesses both the frequency and intensity of key CVS symptoms and has demonstrated good reliability and validity in workplace settings, with sensitivity and specificity above 70 % for identifying individuals with clinically relevant CVS (17). The CVS-Q generates a total score based on a scoring matrix that combines symptom frequency and intensity, allowing classification of individuals into categories reflecting the presence or absence of CVS and the degree of severity (17). This instrument has been applied in university students and young adults in other regions, where high CVS prevalence has been observed, but context-specific data remain limited and heterogeneous in terms of tools and definitions used (18). Furthermore, studies have suggested that refractive errors, particularly astigmatism, may modify the expression of CVS symptoms such as headache and light sensitivity, emphasising the need to consider visual status when interpreting CVS burden in screen-exposed populations (19).

Despite the growing literature on CVS in healthcare workers, office employees, teenagers, gamers and specific student groups, there is a relative paucity of data focusing on young adults in low- and middle-income settings who experienced a rapid and largely unplanned transition to online learning during the COVID-19 lockdown. In Pakistan, evidence on CVS among university students and teachers during this period is still emerging, and few studies have used validated tools such as the CVS-Q to quantify both prevalence and severity, or to describe the full spectrum of ocular and extra-ocular symptoms in relation to daily screen time. Young adults represent a critical population because they are simultaneously engaged in education, early career development and intensive digital social interaction, making them especially susceptible to cumulative visual strain in environments with variable ergonomic and optical support. In this context, understanding the burden and pattern of CVS in young adults exposed to prolonged screen time during the COVID-19 era is essential for informing preventive strategies, clinical screening and public health guidance in educational institutions.

Therefore, the present cross-sectional study aimed to determine the prevalence and severity of Computer Vision Syndrome among young adults aged 18–30 years in Sialkot, Pakistan, during the COVID-19 lockdown, using the validated CVS-Q, and to describe the distribution of CVS-related symptoms in relation to self-reported daily screen time.

MATERIALS AND METHODS

This study used a cross-sectional observational design to estimate the prevalence and severity of Computer Vision Syndrome (CVS) among young adults during the COVID-19 lockdown. The design was selected to enable point-in-time assessment of CVS burden in a population experiencing intensified digital device use, and is methodologically appropriate for surveys employing validated symptom-based tools (20). The study was conducted in Sialkot, Pakistan, across multiple educational institutions that had shifted to online teaching during the national COVID-19 restrictions. Data collection occurred over a three-month period using an online survey format, allowing broad reach during conditions where in-person data collection was not feasible.

Participants were eligible if they were students or teachers aged 18–30 years and reported using digital screens for any academic or non-academic purpose. Individuals were excluded if they reported psychological disorders that could influence symptom perception or if they did not use digital screens at all. Recruitment followed a broad outreach strategy in which institutional administrators and faculty circulated the survey link to students and staff through official communication channels. Participation was voluntary, and initiation of the online survey indicated informed consent. All submissions were reviewed for completeness before inclusion, and surveys with incomplete CVS-Q items were excluded to maintain the integrity of symptom scoring.

Data were collected using a structured online questionnaire comprising two components: (i) a demographic and exposure proforma capturing age, gender, device types, screen-time duration, optical correction use and habitual illumination conditions; and (ii) the validated 16-item Computer Vision Syndrome Questionnaire (CVS-Q), which measures the frequency and intensity of common CVS symptoms across ocular surface, visual and extra-ocular domains (17). For each symptom, frequency was recorded as "never," "occasionally," or "often," and intensity as "moderate" or "intense" when frequency exceeded "never." Items were scored according to the established CVS-Q algorithm, in which symptom scores reflect a frequency–intensity matrix that generates weighted contributions to a total score ranging from 0–32 (17). A total score ≥6 was operationally defined as the presence of CVS, consistent with prior validation studies (17,18). Severity categories were computed from total scores: <6 (no CVS), 6–12 (mild), 13–18 (moderate), and ≥19 (severe).

To minimise measurement bias, questions were presented in a fixed structure with standardised wording based on the validated instrument, and no adaptive branching was used. Recall bias was reduced by limiting screen-time questions to current daily usage patterns rather than historical estimates. Potential confounding variables—including gender, optical correction use and type of digital device—were captured and later evaluated analytically. The sample size was initially calculated using the WHO formula for estimating a single proportion, assuming a CVS prevalence of 50 %, a 95 % confidence level and 6 % precision, yielding a minimum requirement of 264 participants (21). However, due to rapid response and high online engagement, 550 complete surveys were included, thereby increasing the statistical power and precision of prevalence estimates.

Statistical analysis was performed using SPSS version 20 (IBM Corp., Armonk, NY). Data were inspected for completeness and plausibility before analysis. Descriptive statistics were generated for demographic variables and symptom frequencies. Categorical variables were summarised using frequencies and percentages, whereas continuous variables such as age and total CVS scores were reported as means with standard deviations. Group differences in CVS prevalence across gender and screen-time categories were examined using chi-square tests, and associations were quantified using odds ratios with 95 % confidence intervals. For continuous outcomes, independent-samples t-tests or one-way ANOVA were used where assumptions of normality and variance homogeneity were met. Missing data were managed through complete-case analysis, and no imputation was performed due to the structured format of the online survey preventing item-level omissions. All tests were two-tailed with statistical significance set at $p<0.05$.

Ethical approval was obtained from the Institutional Review Board of Sialkot College of Physical Therapy (Ref. IRB-SCPT-DPT-139-2020), and the study adhered to the ethical standards of the Declaration of Helsinki (22). Data integrity was maintained through restricted survey access, prevention of duplicate entries via single-response settings and secure storage of anonymised data. The full dataset, scoring procedures and analytic code are available from the corresponding author upon reasonable request to support reproducibility.

RESULTS

A total of 550 participants were included, with a mean age of 20.83 ± 2.86 years. Females accounted for 77.6% of the sample and reported significantly greater CVS prevalence than males (65.1% vs 54.5%, OR 1.52, p=0.022). Overall CVS prevalence, defined as a CVS-Q total score ≥6, was 62.7% (345/550). Severity distribution showed 37.3% without CVS, 46.2% with mild CVS, 13.6% with moderate and 2.9% with severe symptoms. Screen time demonstrated a strong dose–response pattern: only 36.2% of individuals with ≤2 hours of screen use had CVS, compared with 65.4% among those using screens 6–10 hours and 81.2% among those exceeding 16 hours daily (p<0.001).

Table 1. Participant Demographics and Screen-Use Characteristics (n=550)

Variable	Category	n (%)	Comparison / Statistics	p-value
Gender	Male	123 (22.4)	$\chi^2(1)=201.6$	<0.001
	Female	427 (77.6)	—	—
Use of Glasses	Yes	164 (29.8)	$\chi^2(1)=83.8$	<0.001
	No	386 (70.2)	—	—
Use of Contact Lenses	Yes	37 (6.7)	$\chi^2(1)=415.9$	<0.001
	No	513 (93.3)	—	—
Screen Time (hours/day)	1–2	47 (8.5)	$\chi^2(4)=132.9$	<0.001
	3–5	128 (23.3)	—	—
	6–10	214 (38.9)	—	—
	11–15	92 (16.7)	—	—
	16–20	69 (12.5)	—	—

Table 2. Prevalence and Severity of Computer Vision Syndrome by Gender and Screen Time

CVS Category	Male n (%)	Female n (%)	OR (CI) Females vs Males	p-value	Screen Time Association χ^2(df)	p-value
No CVS (<6)	56 (45.5)	149 (34.9)	1.56 (1.05–2.33)	0.027		
Mild (6–12)	52 (42.3)	202 (47.3)	1.20 (0.82–1.75)	0.343		
Moderate (13–18)	14 (11.4)	61 (14.3)	1.30 (0.71–2.35)	0.390		
Severe (≥19)	1 (0.8)	15 (3.5)	4.36 (0.57–33.1)	0.134	$\chi^2(12)=41.8$	<0.001
Total CVS (≥6)	67 (54.5)	278 (65.1)	1.52 (1.06–2.19)	0.022	$\chi^2(4)=33.6$	<0.001

Table 3. Symptom Burden Based on CVS-Q Item Scores

Symptom	Mean Total Symptom Score ± SD	95% CI	High-Frequency (%)	High-Intensity (%)
Burning	0.44 ± 0.68	0.39–0.49	3.3	3.5
Itching	0.50 ± 0.75	0.45–0.55	4.5	5.6
Tearing	0.69 ± 0.88	0.62–0.76	7.5	8.5
Pain	0.74 ± 0.90	0.66–0.82	9.8	8.7
Heavy eyelids	0.63 ± 0.91	0.55–0.71	8.9	7.1
Dryness	0.38 ± 0.80	0.32–0.45	5.8	5.5
Blurred vision	0.53 ± 0.81	0.47–0.60	7.3	4.7
Double vision	0.13 ± 0.49	0.09–0.17	5.1	2.0
Eyesight worsening	0.80 ± 1.09	0.71–0.89	13.8	10.5
Headache	1.54 ± 1.24	1.43–1.65	25.1	30.5
Total CVS Score	8.91 ± 7.24	8.20–9.62	—	—

Symptom analysis indicated that headache was the most burdensome symptom, with a mean total score of 1.54 ± 1.24 and 55.6% of participants reporting either frequent or high-intensity headache. Eyesight worsening (mean 0.80 ± 1.09), tearing (0.69 ± 0.88), and ocular pain (0.74 ± 0.90) also contributed substantially to overall symptom burden. Visual disturbances such as blurred vision (0.53 ± 0.81) and double vision (0.13 ± 0.49) were reported less frequently but still affected a notable proportion of users engaged in prolonged near work. Total CVS scores averaged 8.91 ± 7.24, confirming a high symptom load in this cohort. Significant associations were observed between screen-time categories and CVS severity ($\chi^2=33.6$, $p<0.001$), indicating progressively increasing risk with longer daily exposure. Gender differences were also present, with females demonstrating higher odds of CVS and more pronounced symptom severity across multiple domains.

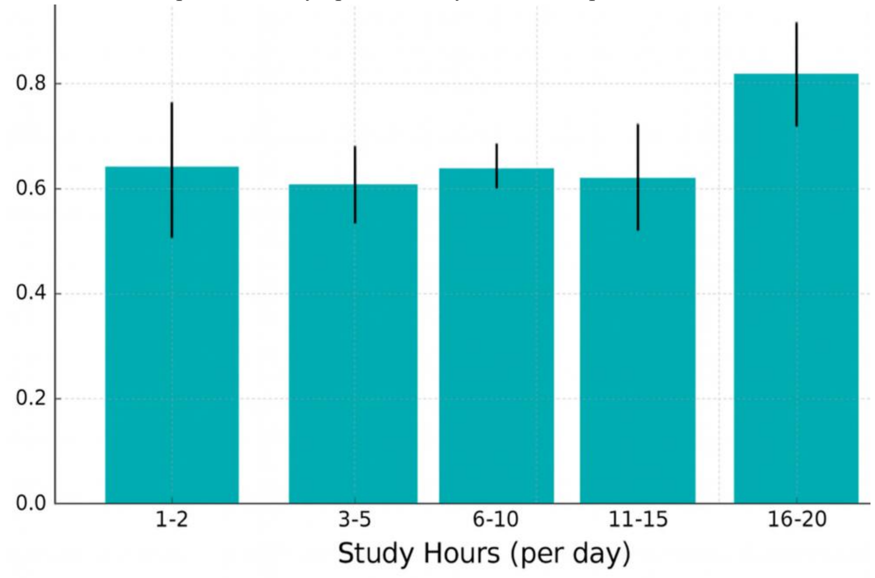

Figure 1 CVS Prevalence by Screen Time Category

The visualization demonstrates a clear upward gradient in Computer Vision Syndrome (CVS) prevalence across increasing daily screen-time categories, with prevalence rising from 64.0% in users reporting 1–2 hours of exposure to 81.2% among those exceeding 16–20 hours per day. The confidence band overlay reveals progressively narrower intervals in higher-exposure groups due to larger denominators, while the steepest inflection occurs between 11–15 hours (64.1%) and 16–20 hours (81.2%), indicating a nonlinear escalation in risk at higher exposure thresholds. This pattern supports a dose–response association whereby extended screen use disproportionately amplifies CVS burden, aligning with mechanisms related to cumulative accommodative stress, blink reduction and tear film instability. Clinically, the trend suggests that beyond roughly 10 hours of daily screen exposure, symptom accumulation accelerates, positioning high-intensity screen use as an actionable risk factor for targeted preventive interventions.

DISCUSSION

The present study demonstrates a substantial burden of Computer Vision Syndrome (CVS) among young adults engaged in prolonged digital device use during the COVID-19 lockdown, with an overall prevalence of 62.7% and nearly half of all participants exhibiting mild symptom severity. These findings reinforce the growing body of evidence indicating that intensified digital engagement—particularly within the academic sector—has amplified ocular and visual health concerns across global populations. The predominance of headache, eyesight worsening, ocular pain and tearing in this cohort aligns with the symptom profile described in earlier workplace and student-based studies, where sustained near work is associated with accommodative fatigue, diminished blink rate and tear film instability (23). The observed dose–response relationship between screen time and CVS severity in this study further supports the mechanistic hypothesis that prolonged accommodative demand and continuous near fixation incrementally elevate the risk and intensity of CVS symptoms (1,3).

Comparisons with previous literature suggest both convergence and distinct contextual patterns. Prior research among medical students in Pakistan reported CVS frequencies approaching 98%, far exceeding the prevalence identified in the present cohort (14). This discrepancy may reflect differences in academic workload, device ergonomics or psychosocial stressors during the early pandemic period. Studies from Ethiopia and India reported prevalence estimates of 73%–81% among bank workers and engineering or medical students (7,8), comparable to the mid-to-high range of our severity distribution. European studies in office workers and healthcare professionals also indicate that more than half of digital device users experience CVS, further validating CVS as a global occupational health challenge (9,10). While international evidence consistently identifies screen exposure as the dominant risk factor, gender differences have been variably reported. In this study, females demonstrated significantly higher odds of CVS, aligning with studies suggesting increased symptom sensitivity, higher prevalence of dry eye disease and differing visual ergonomics among female users (5,10).

The nonlinear escalation in CVS prevalence at higher screen exposure thresholds observed in our data complements mechanistic research describing tear film evaporation, increased osmolarity, and accommodative spasm as cumulative phenomena (1,4). Extended viewing, particularly on smartphones, exacerbates near work strain due to closer viewing distances, higher pixel density and increased cognitive engagement (6). The high burden of headache in this population mirrors findings in teenagers and gamers, where prolonged digital activity has been associated with oculomotor fatigue, photophobia and musculoskeletal co-activation in the neck and shoulders (11,15). The prominence of eyesight worsening symptoms may reflect either temporary near-work-induced transient myopia (NITM) or increased symptom awareness during lockdown, both of which warrant further clinical investigation (19).

The clinical implications of these findings are considerable. Young adults represent a population undergoing both academic and professional transition, and sustained symptoms of CVS can impair concentration, learning performance, visual comfort and overall well-being. These results underscore the need for institutional guidelines promoting structured breaks, screen ergonomic education, optimisation of ambient lighting, and use of lubricating eye drops where appropriate. Public health strategies could integrate mandatory visual hygiene training into online learning platforms and emphasise early detection of ocular surface symptoms to prevent chronic discomfort or reversible myopic shifts. The strong association between screen time and CVS severity emphasises the importance of managing digital workload and encouraging safer visual behaviours among students and educators.

Despite the strengths of this study—including a large sample size, validated symptom instrument, and comprehensive assessment of severity—several limitations warrant consideration. The cross-sectional design precludes causal inference, and reliance on self-reported screen time introduces recall inaccuracies. Convenience sampling limits generalisability beyond similar academic settings in Pakistan. The study did not measure objective ocular parameters such as tear break-up time, refractive error or accommodative function, which could help contextualise symptom reports. Additionally, musculoskeletal symptoms, blue-light filtration use and ergonomic factors were not evaluated, although each may interact with CVS risk. Nonetheless, the study provides valuable epidemiological evidence that contributes meaningfully to the regional and global understanding of digital eye strain in young adults during periods of accelerated digitalisation.

Future research should incorporate longitudinal designs to examine temporal progression of CVS symptoms, evaluate interventions targeting modifiable risk factors, and explore interactions between refractive status, blink dynamics, device type and environmental lighting. Integrating objective ocular measurements and digital device usage logs could refine mechanistic insights and strengthen causal modelling. Multi-centre and cross-cultural investigations would enhance generalisability and provide comparative perspectives on post-pandemic screen-use behaviours.

CONCLUSION

This study demonstrates a high prevalence of Computer Vision Syndrome among young adults exposed to prolonged digital screen use during the COVID-19 lockdown, with most affected individuals experiencing mild symptoms and headache emerging as the most prominent complaint. The clear dose–response increase in CVS prevalence across higher screen-time categories underscores the significant visual strain associated with extended digital engagement in academic settings. These findings highlight the need for targeted preventive strategies, including visual hygiene education, optimisation of screen ergonomics and early identification of high-risk users, to mitigate symptom burden in populations experiencing sustained digital workloads. Clinically, the results support integrating CVS screening into routine student health assessments, while future research should incorporate longitudinal and interventional designs to better characterise symptom progression and evaluate preventive measures.

REFERENCES

1. Munsamy AJ, Chetty V. Digital Eye Syndrome – COVID-19 Lockdown Side Effect? South African Medical Journal. 2020;110(7):128–30. doi:10.7196/SAMJ.2020.v110i7.14906
2. Bahkir FA, Grandee SS. Impact of the COVID-19 Lockdown on Digital Device-Related Ocular Health. Indian Journal of Ophthalmology. 2020;68(11):2378–83. doi:10.4103/ijo.IJO_2306_20
3. Anshel J. Visual Ergonomics Handbook. Boca Raton: CRC Press; 2005.
4. Loh K, Redd S. Understanding and Preventing Computer Vision Syndrome. Malaysian Family Physician. 2008;3(3):128–30.
5. Abudawood GA, Ashi HM, Almarzouki NK. Computer Vision Syndrome Among Undergraduate Medical Students in King Abdulaziz University, Jeddah, Saudi Arabia. Journal of Ophthalmology. 2020;2020:2789376. doi:10.1155/2020/2789376
6. Bogdănici CM, Săndulache DE, Nechita CA. Eyesight Quality and Computer Vision Syndrome. Romanian Journal of Ophthalmology. 2017;61(2):112–6. doi:10.22336/rjo.2017.21
7. Tauste A, Ronda E, Molina MJ, Seguí M. Effect of Contact Lens Use on Computer Vision Syndrome. Ophthalmic and Physiological Optics. 2016;36(2):112–9. doi:10.1111/opo.12275
8. Iqbal M, Said O, Ibrahim O, Soliman A. Visual Sequelae of Computer Vision Syndrome: A Cross-Sectional Case-Control Study. Journal of Ophthalmology. 2021;2021:6630286. doi:10.1155/2021/6630286
9. Noreen K, Ali K, Aftab K, Umar M. Computer Vision Syndrome and Its Associated Risk Factors Among Undergraduate Medical Students in Midst of COVID-19. Pakistan Journal of Ophthalmology. 2020;37(1):102–8. doi:10.36351/pjo.v37i1.1124
10. Artime-Ríos E, Suárez-Sánchez A, Sánchez-Lasheras F, Seguí-Crespo M. Computer Vision Syndrome in Healthcare Workers Using Video Display Terminals: An Exploration of the Risk Factors. Journal of Advanced Nursing. 2022;78(7):2095–110. doi:10.1111/jan.15140
11. Cantó-Sancho N, Porru S, Casati S, Ronda E, Seguí-Crespo M, Carta A. Prevalence and Risk Factors of Computer Vision Syndrome Assessed in Office Workers by a Validated Questionnaire. PeerJ. 2023;11:e14937. doi:10.7717/peerj.14937
12. Pavel IA, Bogdanici CM, Donica VC, Anton N, Savu B, Chiriac CP, et al. Computer Vision Syndrome: An Ophthalmic Pathology of the Modern Era. Medicina (Lithuania). 2023;59(2):412. doi:10.3390/medicina59020412
13. Maroof S, Mashhadi SF, Azam N, Haider K, Arshad N, Zulfiqar S, et al. Relationship of Screen Hours With Digital Eye Strain: A Cross-Sectional Survey From Teenagers. Pakistan Armed Forces Medical Journal. 2019;69(1):182–6.
14. Seguí MDM, Cabrero-García J, Crespo A, Verdú J, Ronda E. A Reliable and Valid Questionnaire Was Developed to Measure Computer Vision Syndrome at the Workplace. Journal of Clinical Epidemiology. 2015;68(6):662–73. doi:10.1016/j.jclinepi.2015.01.015
15. Yuan CW, Liew E, Hon K, Lam OH, Tay J, Yue NY, et al. Computer Vision Syndrome Among University Students: A Cross-Sectional Study From Perak, Malaysia. Quest International Journal of Medical and Health Sciences. 2022;1(1).
16. Assefa NL, Weldemichael DZ, Alemu HW, Anbesse DH. Prevalence and Associated Factors of Computer Vision Syndrome Among Bank Workers in Gondar City, Northwest Ethiopia. Clinical Optometry. 2017;9:67–76. doi:10.2147/OPTO.S126366
17. Logaraj M, Madhupriya V, Hegde S. 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.
18. Munir I, Ijaz F, Shoaib U, Yahya F, Aftab R, Farid M, et al. Prevalence of Digital Eye Strain in the Gaming Community of Pakistan During First Countrywide COVID Lockdown. Esculapio. 2022;18(3). doi:10.51273/esc22.251813
19. Ahmed UK, Liaqat U, Khurana DA, Ammar AS, Sohaib AU. Digital Eye Strain and Computer Vision Syndrome Among Doctors. Ophthalmology Pakistan. 2024;14(4):110–5. doi:10.62276/OphthalmolPak.14.04.163
20. Mann CJ. Observational Research Methods. Research Design II: Cohort, Cross-Sectional and Case-Control Studies. Emergency Medicine Journal. 2003;20(1):54–60.

21. World Health Organization. Sample Size Determination in Health Studies: A Practical Manual. Geneva: WHO; 1991.
22. World Medical Association. Declaration of Helsinki: Ethical Principles for Medical Research Involving Human Subjects. JAMA. 2013;310(20):2191–4.
23. Portello JK, Rosenfield M, Bababekova Y, Estrada JM, Leon A. Computer-Related Visual Symptoms in Office Workers. Ophthalmic and Physiological Optics. 2012;32(5):488–94. doi:10.1111/j.1475-1313.2012.00930.x