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Pattern of computer vision syndrome in post COVID period in patients attending a tertiary hospital of central Nepal

Polina Dahal[1], Anil Suvedi[2], Ujjwol Bhattarai[3], Rajib Chaulagain[4]

[1]Consultant, [2]Resident, [3]Intern, Department of Ophthalmology, Chitwan Medical College-Teaching Hospital, Chitwan, Nepal
[4]Consultant, Department of Oral Pathology, Chitwan Medical College-Teaching Hospital, Chitwan, Nepal (*at the time of study)

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Abstract

Introduction: The increasing use of digital devices has led to a rise in Computer Vision Syndrome (CVS), characterized by ocular and musculoskeletal symptoms. This study aims to determine the pattern of CVS in the post-COVID period among patients attending the ophthalmology outpatient department of Chitwan Medical College, Nepal.

Method: A hospital-based cross-sectional study was conducted in the ophthalmology outpatient department of Chitwan Medical College from 01 Nov 2023 to 30 Apr 2024. After ethical approval (CMC-IRC/080/081-055) and informed consent, consecutive patients with asthenopic complaints using Visual Terminal Displays were enrolled through convenience sampling method. Data collected using a structured proforma and analysed descriptively using SPSS 26.

Result: Among 331 patients with CVS, most affected age group was 16-25 years 157(47.4%), males 179(54.1%), students 218(65.8%), 151(45.6%) reported foreign body sensation, 148(44.7%) followed by burning sensation, 169(51.1%) had refractive error most commonly simple myopia 96(29.0%), and 174(52.6%) had mild dry eyes, poor sleep pattern in 74(22.4%), at least one Musculoskeletal pain in 217(65.5%). Dual device users were175(52.9%), and 133(40.2%) had screen time 4-6 h/day, and preventive measures was used by 150(45.3%), 18(5.4%) followed 20-20-20 rule and only 7(2.1%) maintained the screen distance.

Conclusion: In this study CVS in the post-COVID period was most common among students and bankers with history of prolonged screen time, using multiple devices, and lack of preventive measures contribute to its severity. Awareness campaigns emphasizing preventive strategies, including ergonomic practices and screen time regulation, are essential to mitigate its impact.

How to cite

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Correspondence

Polina Dahal, Department of Ophthalmology, Chitwan Medical College-Teaching hospital (CMCTH), Bharatpur-10, Nepal. Email: dahal.polina@cmc.edu.np, Telephone: +977 9845417133

Introduction

The ocular complaints experienced by computer users typically include eyestrain, eye fatigue, burning sensations, irritation, redness, blurred vision, and dry eyes, among others. The condition of a person experiencing one or more of these ocular complaints as a result of operating a computer and looking at a computer monitor is generally referred to as "Computer Vision Syndrome" (CVS).[2] It is evident that, prolonged use of digital gadgets is associated with not only the ocular symptoms but also the musculoskeletal and neuropsychiatric symptoms among the users.[3] The use of digital screen has become common among students and professionals and the recent pandemic of novel corona virus is the pivot point. This indeed has increased the time spent on these electronic and digital gadgets and is the sole contributor of CVS.[4,5] Patients experience symptoms of computer vision syndrome constantly, affecting their quality of life.

The prevalence of computer vision syndrome is increasing in the world as well as in Nepal. It has affected 48-99% of computer users.[6,7] It has spiked up since the COVID-19 pandemic causing inevitable digital surge in response to nationwide lockdown and work from home practices mainly affecting the working professionals and the students.[8] However, the magnitude of the problem has been realized only since few years attributing to few researches done mostly among the computer workers and students. The main objective of this study was to assess the pattern of computer vision syndrome in post COVID period in patients attending a tertiary care hospital of central Nepal.

Method

This was a hospital-based descriptive cross-sectional study conducted in the Ophthalmology outpatient department conducted from 01 Nov 2023 to 30 Apr 2024 in Chitwan Medical College, Bharatpur 10, Nepal. The study was conducted after the ethical approval by Institutional Review committee of Chitwan Medical College (CMC-IRC/080/081-055). Data was collected and filled in the standardized proforma after obtaining the informed consent.

All the patients using Visual Terminal Displays (VTDs) who had come to our outpatient department from 01 Nov 2023 to 30 Apr 2024 with asthenopic complaints were screened and were included in the study. Sample size was calculated from convenience sampling method and a total 331 patients were included in our study.

A structured proforma was prepared and filled with detailed history of patient with socio-demographic profile like age, sex, occupation was asked. Detailed clinical features for which the patient had come to eye checkup like foreign body sensation, headache, burning sensation, redness of eyes, itching, heaviness of eyes, feeling that eye sight is worsening, blurred vision, excessive blinking, eye pain, watering, photophobia and double vision was asked. Patient was also asked about number of devices used at a time, types of devices and duration of devices used since how long and how many hours per day. Detailed history of sleep pattern, anxiety and stress was also asked. Any history of neck, shoulder, lower back, upper back and wrist pain was also asked. Any history of preventive measures applied like, protective glasses, artificial eye drops, screen filters use, following rule of 20-20-20, were taken. Any history of prevalent refractory error and types of refractive error were also taken.

Data were descriptively analyzed for frequency and percentage using SPSS 26.

Result

Among 331 patients diagnosed with computer vision syndrome, The most affected age group was 16 -25 years 157(47.4%), males 179(54.1%), students 218(65.8%), Table 1.

On clinical evaluation, 151(45.6%) reported foreign body sensation 148(44.7%) followed by burning sensation, and other eye symptoms, Table 2.

Refractive error was seen in 169(51.1%), most commonly simple myopia 96(29.0%), and 174(52.6%) had mild dry eyes on Schirmer's test, and 93(28.1%) had no dry eyes, Table 3.

Mental Health Status of patients was affected most commonly poor sleep pattern in 74(22.4%), Table 4. Musculoskeletal pain was common, with at least one symptom in 217(65.5%), most commonly neck pain 91(27.5%) and least common was wrist pain in 6(1.8%), Table 5.

Most of the patients were dual device user 175(52.9%), and 133(40.2%) had screen time for 4-6 h/day, Table 6. Preventive measures were used by 150(45.3%), most commonly blue cut glass 72(21.8%), 18(5.4%) followed 20-20-20 rule and 7(2.1%) maintained the screen distance, Table 7.

Table 1. Socio-demographic profile of patients with computer vision syndrome in post COVID period, n=331

Variables	n(%)
Age Years	
5-15	10(3.0)
15-25	157(47.4)
25-35	92(27.8)
35-45	48(14.5)
>45	24(7.3)
Gender	
Male	179(54.1)
Female	152(45.9)
Occupation	
Students	218(65.8)
Bankers	34(10.3)
Shopkeeper	28(8.5)
Home maker	17(5.1)
Paramedics	14(4.2)
Others	20(6.0)

Table 2. Ocular symptoms among patients with computer vision syndrome in post COVID period, n=331

Ocular symptoms	n(%)
Foreign body sensation	151(45.6)
Burning sensation	148(44.7)
Headache	119(36)
Heaviness of eye	119(36)
Blurring of vision	117(35.3)
Heaviness of lids	80(24.2)
Itching	79(23.9)
Feeling of worsening of eyesight	74(22.4)
Watering	64(19.3)
Eye redness	45(13.6)
Eye pain	38(11.5)
Excessive blinking	31(9.4)
Photophobia	29(8.8)
Double vision	14(4.2)

Table 3. Refractive error and severity of dry eyes in computer vision syndrome in post COVID period, n=331

Variables	n(%)
Refractive error	169(51.1)
Type of refractive error	
Simple myopia	96(29.0)
Myopia+presbyopia	36(10.9)
Presbyopia	22(6.6)
Simple myopic astigmatism	8(2.4)
Simple hypermetropia	4(1.2)
Compound astigmatism	3(0.9)
Schirmer's test	
Mild dry eye	174(52.6)
Moderate dry eye	59(17.8)
Severe dry eye	5(1.5)
No dry eye	93(28.1)

Table 4. Mental health Status of patients with computer vision syndrome in post COVID period, n=331

Mental Health	n(%)
Anxiety	59(17.8)
Stress	67(20.2)
Poor leep	74(22.4)

Table 5. Musculoskeletal pain among patients with computer vision syndrome in post COVID period, n=331

Musculoskeletal pain	n(%)
Neck	91(27.5)
Shoulder	52(15.7)
Neck and lower back	38(11.5)
Lower back	23(6.9)
Upper back	7(2.1)
Wrist	6(1.8)
None	114(34.4)

Table 6. Use of visual display terminals among patients with computer vision syndrome in post COVID, n=331

Variables	n(%)
Duration of use months	
<6	8(2.4)
6-12	24(7.3)
>12	299(90.3)
Number of devices	
1	110(33.2)
2	175(52.9)
>2	46(13.9)
Screen time per day hours	
<4	53(16.0)
4-6	133(40.2)
6-8	77(23.3)
>8	68(20.5)
Type of device	
Cell phones	80(24.2)
Cell phones+computer	133(40.2)
Cell phones+iPad	42(12.7)
Cell phones+tablet+computers	46(13.9)
Computer	16(4.8)
Tablets	3(0.90)
IPad	11(3.3)

Table 7. Preventive Measures among patients with computer vision syndrome in post COVID period, n=331

Variables	n(%)
Used preventive measures	**150(45.3)**
Blue cut glasses	72(21.8)
Eye drops	53(16.0)
20-20-20 rule	18(5.4)
Distance	7(2.1)
None	**181(54.7)**

Discussion

In our study, the most affected age group was 16-25-year, which is consistent with other studies.[9] This is the age group of school and college going students, and disease burden was more among the students who are prone to educational exposure to VDTs and gadgets. Studies have reported that there is greater prevalence among the males which is similar to our study.[10,11] However, prevalence in female is found to be more in some studies.[12-14] This difference might be due to the difference in study setting, and occupation. This highlights the need community-based study with wide range of participants from the society.

The commonest profession affected were students, followed by bankers. This is similar to the studies from Nepal and others countries.[12,15,16] Our study was a hospital based and limited to small population limiting all the professionals who might be exposed to VDTs. Majority of the patients presented with foreign body sensation 151(45.6%), and 119(36%) had headache, etc. Similar finding is reported in

other studies with 62.6% headache, dry eyes 51.4%, neck pain/shoulder pain/ back pain 51.4%.[17] The symptoms variation in different studies may be due to geographical location, the climate and other environmental factors.

We found abnormal Schirmer's test in 238(71.9%) of the patients. This attributes to the association of dry eyes among the VDT users. Similar study showed cumulative device exposure time of more than 3-3.5 h per day had a significantly increased risk of pediatric Dry Eye Disease.[18] Several large cross-sectional studies have demonstrated a relationship between digital screen use and dry eye.[19-21]

There were 169(51.1%) of the patients who had refractive errors, among which simple myopia was the most prevalent refractive error 96(29%). This directs the study towards suspecting if CVS is more common among patients with refractive error. Another study also showed 69.1% symptomatic Thai university students had refractive error.[23]

The prevalence of musculoskeletal symptoms in present study neck pain was seen in 91(27.5%) followed by shoulder pain in 52(15.7%). This may be due to prolonged screen time, 40.2% used VDTs for 4-6 hours, and only 7(2.1%) maintained screen distance. Distance of <12 inches from mobile phone has been reported in literature to be associated with eye irritation and neck shoulder pain.[24]

In our study, sleep pattern was poor in 74(22.4%) with stress in 67(20.2%) and anxiety in 59(17.8%). In a study among Lebanese male adolescents also reported high prevalence of depression, anxiety, insomnia and stress in CVS.[25] Long-term use of VTDs has been shown to be associated with shorter sleep times and lower sleep efficiency.[26]

More devices and longer screen time is associated CVS.[27] We found 175(52.9%) used 2 devices spending >4 h/day. The higher lifetime exposure to smart phones has been found to be associated with higher likelihood of having multiple ocular symptoms.[28] In Kerala, India among user for >1 year, 79% mentioned having at least one ocular symptom.[29] In present study we found that patients with screen exposure for 4-6 hours had higher prevalence of CVS in 133(40.2%) compared to only 52(16%) with screen exposure < 4 hours per day.

In our study, 72(21.8%) used blue cut glasses and 53(16.0%) used lubricating drops as preventive measures. Also, in our study, 181(54.7%) did not use preventive measures. The least common use of preventive measure was rule of 20-20-20. This attributes to the decreased level of awareness and ignorance among the patients. A study showed that improper viewing distance, not using an anti-glare screen, not using eye-drops, and not wearing protective goggles were significantly associated with the presence of CVS.[30]

Various studies have shown different prevalence in developed and underdeveloped countries.[31] Thus, in local setup it is yet to see what other related factors such as type of display and quality of device, brightness and manufacturing properties etc. which may affect the vision syndrome. In present study environment factors like improper lighting, display position and viewing distance, user's visual abilities, oculomotor disorders and tear film abnormalities were not studied in depth.

Although, the use of visual gadgets is inseparable, this study highlights the pattern of Computer Vision Syndrome to address the public health issue about the deleterious effects of excessive use of visual devices and preventive measures like use of blue light glasses, eye drops, maintaining screen distance, reduction in screen time per day, standard ergonomic practices that could be taken into consideration.

Conclusion

This study highlights the high prevalence of Computer Vision Syndrome (CVS) among Visual Display Terminal (VDT) users in the post-COVID period, especially among students and bankers being the most affected groups. The most commonly reported symptoms were foreign body and burning sensation, musculoskeletal

complaints such as neck and shoulder pain. More than half of the participants did not adopt any protective measures. Future research should focus on identifying additional risk factors and evaluating the effectiveness of preventive measures in mitigating CVS-related complications.

Author contribution

Concept and design- PD; literature review-All; Data collection and analysis- PD, AS, UB; Draft-PD; Revision- AS, UB, RC; Final manuscript and accountability- All authors have read and agreed to the final version of the manuscript.

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Conflict of Interest

None

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Supplementary material

The data and supplementary material which support the findings of this study are available from the corresponding author upon reasonable request.

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