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Addressing computer vision syndrome among different sections of society working digitally amidst prevailing covid-19 pandemic: A cross-sectional study

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Abstract: *Background:* Ongoing Pandemic led to embrace technology like never before, which can lead to a rise in the number of ocular complaints grouped under computer vision syndrome (CVS) and put them at a higher risk for developing myopia and serious eye problems in future. *Objectives:* To assess the magnitude of the emerging significant ocular health problems addressed as CVS and awareness regarding preventive measures to be taken to maintain good ocular health. *Methodology:* A modified structured Performa was distributed as google form among different sections of Indian society working digitally to collect socio-demographic information, knowledge about CVS, preventive measures taken while working digitally, and questions regarding screen time. A validated CVS questionnaire was administered to assess 16 symptoms, scored using two rating scales for frequency and intensity. A total score of ≥ 6 points is said to suffer from CVS. Statistical analysis was done by mean, standard deviation, chi-square test of independence, and p-value. *Results:* 506 digitally working people having a mean age of 32.37±12.69 years; 54.74% were male and 45.26% were females. The majority (36.36%) fell under 21-30 years. Prevalence of CVS was 49.81% in males and 50.12% in females. The most commonly reported complaint was headache (70.35%). The majority of subjects (78.10%) with CVS experienced symptoms in moderate intensity. Majority (36.95%) adjusted screen brightness between 25-50%, while 8.89% kept their screen brightness to <10%. 45.25% of population were either not aware or were not sure about the preventive measures for maintaining a good ocular hygiene. *Conclusion:* Digitally working sections of Indian society had a high prevalence (53.95%) of CVS, with no significant gender preponderance. Average screen time of >6 hours per day, duration of continuously staring at the screen, screen brightness levels, pre-existing refractory error, Knowledge about preventive measures to maintain good ocular hygiene were significantly associated with the development of CVS.

Keywords: Asthenopia, Myopia, Prevalence, Risk Factors, Syndrome.

Introduction

Digitalization has become a symbol of the modern age. Ongoing pandemic led to embrace technology like never before with digital screens becoming part and parcel of everyday life of a large section of our society, be it children completing online activities as a part of home-schooling, socializing with peers, or playing games digitally on screens due to restricted outdoor activities, be it, teachers, preparing assignments and tutorials and conducting classes digitally, conference, meetings, and workshops being held on digital platforms work from home culture in IT sector, freelancing, data operating, etc. This increase in the use of screens to meet these tasks can lead to an increase in the number of ocular complaints grouped under computer vision syndrome, defined as a complex of eye and vision problems related to activities which increase stress for near vision and experience with the use of computers for a protracted and uninterrupted period, eye muscles not able to fully recover from constant tension required to maintain focus on a close object, i. e, visual demands exceed visual abilities of an individual to comfortably perform the task [1].

These symptoms could be asthenopic like eye strain, tired eyes; ocular surface-related like watering, irritation and dry eyes, burning

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sensation; visual symptoms like blurred vision extraocular manifestations like the neck, shoulder, and back pain [2]. It could lead to a decrease in accommodative power and near-sightedness [3]. Also, due to improper workspace at home which may not be at par with ergonomics could further worsen these conditions. Studies have found the prevalence of CVS ranging from 64% to 90% among computer users [4].

It is estimated that globally around 60 million people suffer from this syndrome [5], and due to prevailing work from home situation, making people work digitally to safeguard themselves from the novel coronavirus, this number could have increased tremendously. While working digitally on screens, our eyes have to focus and refocus all the time and have to react to images moving and changing constantly, shifting focus, sending rapidly varying images to the brain and requiring a lot of efforts from eye muscles, the situation is further worsened by glare and contrast offered by screens. Studies have also proven that we tend to blink less frequently while using digital screens, causing dry eyes, and blurring of vision periodically while working. Screens are said to emit short-wavelength blue light between 415-455 nm. This high energy blue light passes via the cornea and lens to the retina causing diseases like dry eye, macular degeneration [6].

Also, it leads to irreversible photochemical retinal damage [7] and as it is of short wavelength, the focus is located in front of the retina, so it's long exposure can worsen visual fatigue and near-sightedness [8]. Blue rays' irradiation also increases reactive oxygen species production in corneal epithelial cells and mediated oxidative damage and apoptosis lead to ocular inflammation and xerophthalmia, confirmed by studies showing its association with the development of dry eyes [9-10].

This light pollution can significantly damage our ocular health. Hence, this study becomes eminent amidst this global pandemic where all attention has been laid towards mental health, so that timely interventions could be done to tackle this problem. It becomes important that preventive measures to maintain good ocular health among different sections of our society be promoted, as digital platforms are being promoted, work from home is promoted but there is very little awareness among people regarding the preventive strategy to be adopted to tackle this condition.

Material and Methods

a) Study design- A cross-sectional study.
b) Study Period- 1-month duration from September- October 2020.
c) Study population- Different sections of our society, falling in different age groups, having different job status, and working on digital screens.
d) Sample size estimation- Convenient sampling technique for selection.
e) Criteria for selection of the study group-

Inclusion criteria: All willing participants who gave informed consent and work digitally, can understand English and/or Hindi, has internet access to receive online google questionnaire.

Exclusion criteria: Subjects not giving consent for participation.

Procedure: The study was cleared by the Institutional Ethics Committee on Human Subject Research (Ref: MDC/DOME/375). A well-informed written consent was taken from all the participants. A structured proforma was used to collect socio-demographic and nationality information. A validated Computer vision syndrome (CVS) questionnaire was administered. Information regarding the preventive measures taken to maintain good ocular hygiene was taken. CVS questionnaire (CVS-Q) administered has acceptable psychometric properties. It assesses 16 symptoms which are scored using two rating scales, one for frequency and the other for intensity.

The responses are combined multiplicatively into one rating scale for the analysis, resulting in a single symptom severity score. Rasch analysis showed that the 16 items form a unidimensional scale to adequately fit the RSM with no evidence of substantive DIF by gender or age, with person separation reliability = 0.69 and internal consistency (Cronbach's alpha) = 0.78. Rasch analysis established the hierarchy of difficulty (severity) of symptoms, from the least severe,

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"itching", to the most severe, "double vision". It has good validity; its sensitivity and specificity are above 70% [11]. The questionnaire is well accepted. Scores are calculated as 0 x 0, 0 x 1 and 1 x 0 = 0; 1 x 1 = 1; 2 x 1 and 1 x 2 = 2; and 2 x 2 = 4, i.e., a rating scale with the following options: 0, 1, 2 and 4 which, for purposes of Rasch analysis, is equivalent to: 0, 1, 2 and 3. The two intermediate categories are collapsed into one, thus the rating scale for the analysis had three categories: 0, 1, and 2. Individuals scoring ≥ 6 points were said to suffer from computer vision syndrome.

Statistical analysis: Data was entered using Microsoft excel and was analysed using SPSS statistical package for Windows, version 20.0 with help of descriptive statistics like mean ± standard deviation, percentages. The Chi-square test of independence was done for comparison and calculating the p-value. p-value ≤ .05 was considered statistically significant.

Results

Table-1: Socio-demographic characteristics of respondents

Sl. No.	Characteristics	Results
1	Sample size	n=506, digitally working population.
2	Age	mean age was 32.37±12.69 years (age range between 9-76 years)
3	Gender	54.75% (n=277) of the study population were males, while 45.25% (n=229) were females.
4	Occupation	Different occupation/ job status (school and college students, teachers, doctors, scientists, bankers, clerks, computer analysts, service, IT sector, engineers, research scholars, architects, government job workers, assistants, agriculture inspectors and officers, professors and lecturers, accountants, private sector employees, homemakers etc.) were taken into consideration.

Table-2: Age frequency table with sex distribution in a particular age range

Age range (years)	Total participants	No of males	No of females
0-10	2	2	0
11-20	78	32	46
21-30	184	90	94
31-40	108	64	44
41-50	76	48	28
51-60	47	35	12
61-70	10	9	1
71-80	1	0	1

A majority (36.36%) of the study population belonged to age group of 21-30 years, A Majority (36.36%) of the study population belong to age group of 21-30 years, followed by (21.34%) in 31-40 yrs (Table 2).

Prevalence of CVS: Digitally working sections of Indian society had a high prevalence (53.95%) of CVS. Prevalence of CVS was 49.81% in males and 50.12% in females (p = 0.9447), found to be non-significant. For the purposes of this analysis, eight age subgroups at ten-year intervals were established. The prevalence of CVS was highest (54.89%) among those aged between 21-30 years and lowest among 71-80 years with no reported case (Table: 3).

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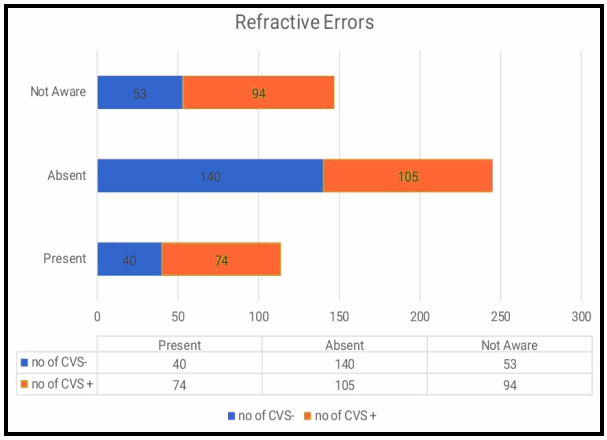
Table-3: Showing prevalence of CVS among males and females falling in different age groups				
Age range (years)	**Total individuals**	**Total CVS positive cases**	**CVS positive males**	**CVS positive females**
0-10	2	1	1	0
11-20	78	44	14	30
21-30	184	101	45	56
31-40	108	55	30	25
41-50	76	40	24	16
51-60	47	26	17	9
61-70	10	6	5	1
71-80	1	0	0	0

Pre-existing refractory error was reported by 22.52% (n=114) of the study population, out of which 64.91% (n=74) reported CVS, while 77.47% (n=392) of the population didn't have any refractory error or were not aware of it, among them the prevalence of CVS was 50.76% (n=199).

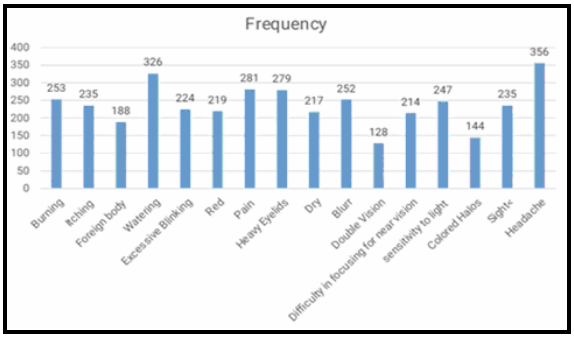
The Chi-square test of independence found a significant relationship between pre-existing refractory error and CVS with a chi-square value of 7.11 and a (significant p value= 0.007). The chi-square statistic with Yates correction is 6.5565. The p-value is .01045 (Significant at $p < .05$) (Graph 1).

Graph-1: Prevalence of pre-existing refractory errors and reporting of CVS.



The most disturbing symptom was headache (70.35%), followed by watering from the eyes (64.42%), pain in the eyes (55.53%), and the least common complaint was a double vision (25.29%). The prevalence of each symptom in all participants is presented in (Graph 2).

Graph-2: Prevalence of each CVS symptom.



The majority of subjects (78.10%) with CVS experienced symptoms in moderate intensity, while intense intensity was reported by (21.90%) (Graph 3).

32.60% of participants had an average screen time of > 6 hours, followed by 23.32% using it for 4-6 hrs. Chi-square statistic value of 11.345 and p value= 0.22 was obtained, i.e. significant relation was found to exist between the average screen time per day and CVS (Graph 4).

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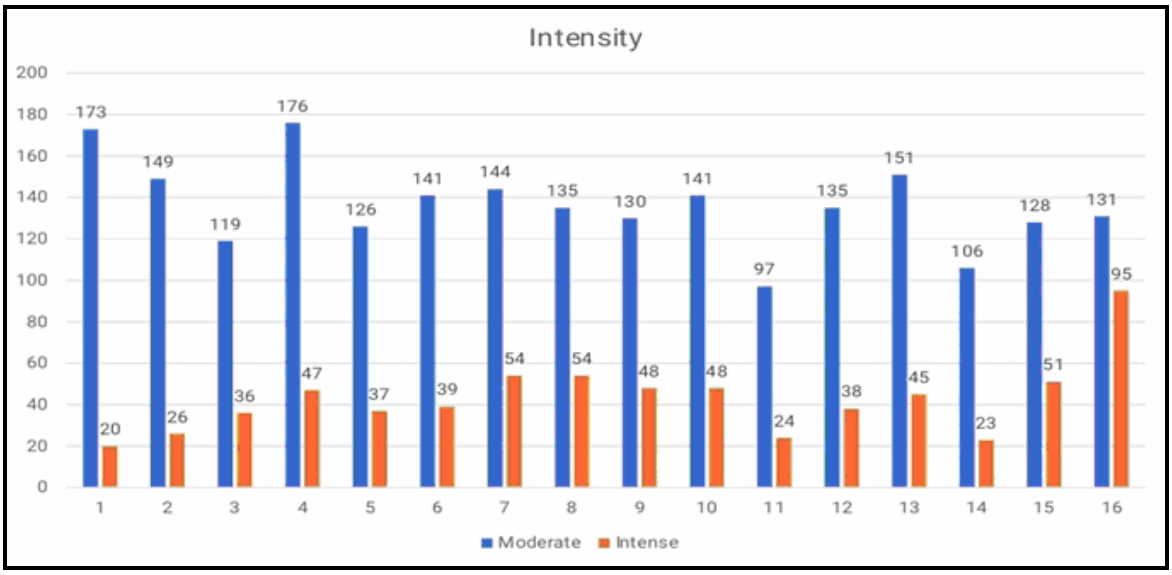
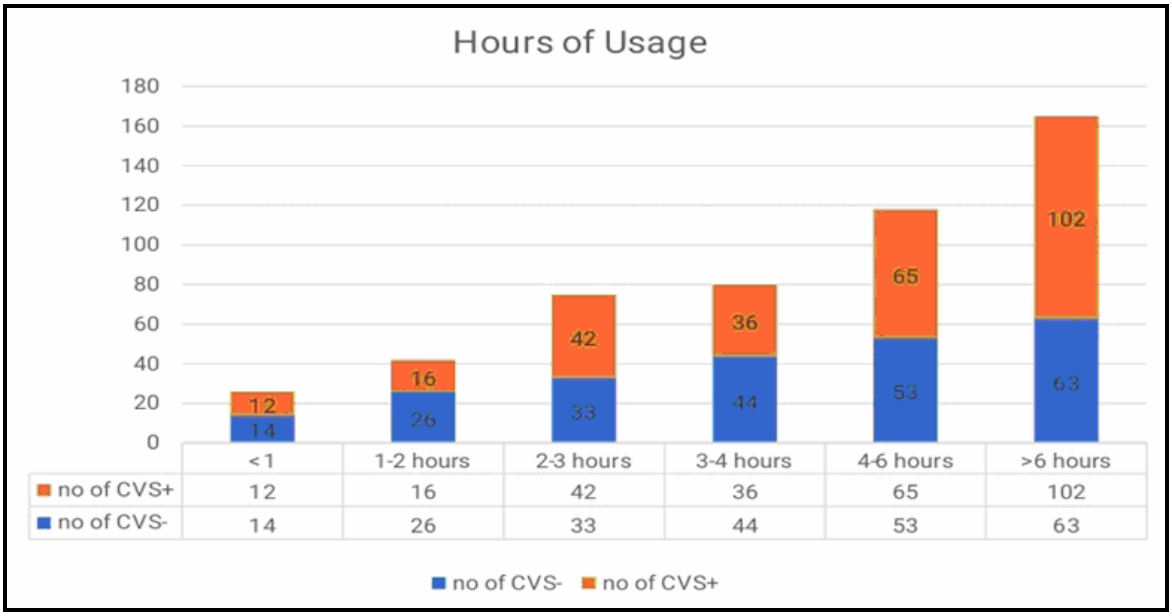
Graph-3: Intensity of symptoms reported by the digitally working population.



Graph-4: Average screen time per day by digitally working population and prevalence of CVS.



The duration of continuously staring at the screen is found to be significantly associated with the prevalence of CVS with a chi-square test of independence value of 7.24 and p value= 0.007. Chi-square statistic with Yates correction is found to be 6.68 and a significant p-value of 0.009, (Graph 5) while screen time of >6 hours continuous and interrupted usage with CVS were found not to be related with chi-square statistic value= 1.78 and p value= 0.18; with Yates correction, the value of chi-square test= 1.37 and p value=0.24 (non-significant) (Graph 6).

Chi-square test of independence performed to examine the relation between the majority of screen usage during day or night and development of CVS established no significant relationship between the two variables with chi-square value= 1.124 and p value= .28. The chi-square value with Yates correction is 0.87 and p value= 0.35 (non-significant).

In contrast to other studies, the present study did not establish any relationship between the

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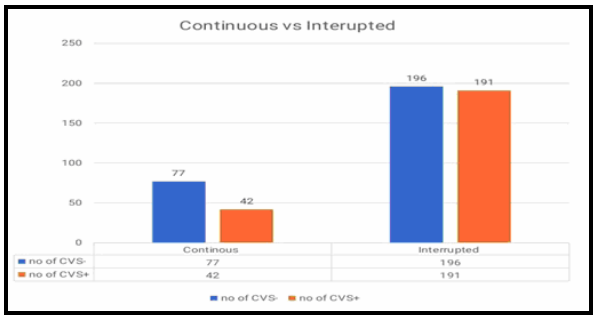
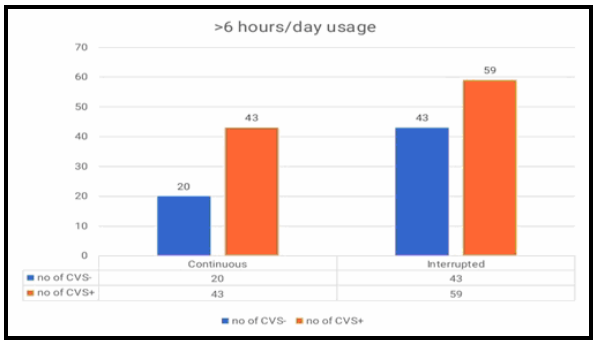
sizes of screen used for working digitally. Chi-square statistic was 0.000 with p value= 0.97. Chi-square statistic with Yates correction is 0.003 with a p-value of 0.95 (non-significant).

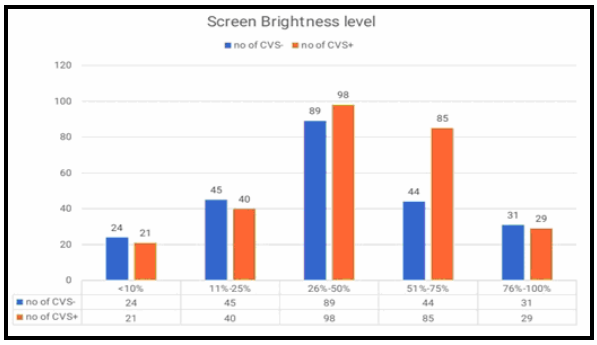
Graph-5: Continuous v/s interrupted screen usage and prevalence of CVS.



Graph-6: Screen time > 6 hours/day with continuous and interrupted usage and prevalence of CVS.



Graph-7: Screen brightness levels and prevalence of CVS.



Another factor assessed was whether the digital screen users adjust the screen brightness and contrast with surrounding. Majority of the study population (36.95%) adjusted screen brightness between 25-50%, followed by 50-75% screen brightness by 25.49%. Only 8.89% kept their screen brightness to <10%. The Chi-square test of independence established a significant relationship between screen brightness levels and CVS in the present study with chi-square value=10.93 and p value=0.27(significant at p value<.05) (Graph 7).

Knowledge about preventive measures to maintain good ocular hygiene was reported by 54.74% (n=277) of the population while 45.25% (n=229) of them were either not aware or wasn't sure about it. Chi-square test of independence to find the relation between the two variables knowledge about precautionary measures for good ocular health and CVS was significant in the present study with chi-square value= 4.97 and p value= 0.025 and with Yates correction, chi-square value= 4.58 and p value= 0.032(significant at p-value < 0.05).

Discussion

The present study was conducted on different sections of the Indian society, falling in different age groups, having different job status, and working on digital screens with the primary objective to determine the prevalence of computer vision syndrome among them and secondarily to know whether they are aware of the preventive measures and ergonomics of working digitally without significantly affecting their ocular health, working digitally being the need of the hour. The prevalence of CVS in the present study was 53.95% (n=273). The observation was on par with the results obtained by other Indian community-based studies on computer operators [12].

A majority (36.36%) of subjects in our study were falling under 21-30 years, followed by (21.34%) in 31-40 years. The prevalence of CVS was highest (54.89%) among 21-30 years and lowest among 71-80 years with no reported case. The probable reason being the use of social media and multitasking being prominent among younger adults with 87% of individuals aged 20–29 years reporting the use of two or more digital devices simultaneously [13].

We found no significant gender preponderance regarding the development of CVS in our study which is contrary to the study conducted by Shantakumari et al. who reported significantly higher reporting of symptoms in females [14]. The difference in

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the prevalence rate of CVS as found by several studies depends on factors like average screen time, preventive measures, pre-existing refractory error, type of digital screen being used, majority of screen time during day or night, etc. The present study has found that average screen time of >6 hours per day, duration of continuously staring at the screen, screen brightness levels, pre-existing refractory error, knowledge about preventive measures to maintain good ocular hygiene were significantly associated with the development of CVS.

The most disturbing symptom reported in our study was headache (70.35%), followed by water from the eyes (64.42%), pain in the eyes (55.53%), and the least common complaint was a double vision (25.29%). It is in line with other studies like that conducted by Akinbinu et al. also reported eyestrain and headache as the most disturbing symptoms [15]. The majority of subjects (78.10%) with CVS experienced symptoms in moderate intensity, while 21.90% reported symptoms being intense. The majority of subjects in our study had an average screen time of > 6 hours, followed by subjects using screens for 4-6 hrs. A significant relation was found to exist between the average screen time per day and CVS in our study, the findings being in line with other studies reporting no of hours spent in front of screens significantly increases the risk of CVS; [16, 17] making it imperative to decrease the amount of time spent in front of screens to prevent the development of CVS [18].

The possible explanation for it being that high energy blue light or electromagnetic radiations emitted from the digital screen can pass via the cornea and lens to the retina causing diseases like dry eye, macular degeneration [6]. Also, it leads to irreversible photochemical retinal damage [7], and as it is of short wavelength, the focus is located in front of the retina, so their prolonged exposure can worsen visual fatigue and near-sightedness. The duration of continuously staring at the screen was found to be significantly associated with the prevalence of CVS. This might be because our eyes have to focus and refocus all the time and have to react to images moving and changing constantly, shifting focus, sending rapidly varying images to the brain and requiring a lot of efforts from eye muscles and also, if the refresh rate is too slow, it will cause high flickering screen, contributing to symptoms of CVS [19]. The results of our study are in line with previous similar studies stating that taking short breaks in between is a protective factor for CVS [20-21].

The American Optometric Association promotes the 20-20-20 rule (a 20 s break every 20 min to view a distant object at 20 feet) to alleviate DES [22]. Studies have shown that taking short breaks of 5 min after continuous working digitally for an hour, could decrease eye problems without significantly affecting the work productivity [23]. Majority of the study population (36.95%) adjusted screen brightness between 25-50%, followed by 50-75% screen brightness by 25.49%. Only 8.89% kept their screen brightness to <10%. In our study, a significant relation was observed between adjustment of screen brightness and prevalence of CVS. A pre-existing refractory error was reported by 22.52% of the study population, out of which 64.91% reported CVS, while 77.47% of the population didn't have any refractory error or were not aware of it, among them the prevalence of CVS was 50.76%. Findings are in concordance with studies conducted in India showing computer users with a history of eye problems were at high risk of CVS development [24].

Knowledge about preventive measures to maintain good ocular hygiene was reported by 54.74% of the population while 45.25% of them were either not aware or wasn't sure about it. The individuals having good knowledge regarding preventive measures were found to be significantly less impacted by CVS. The results were in agreement with studies conducted in Malaysia [25] and Nigeria [26]. However, the present study did not find an association between the majority of screen usage during day or night and the prevalence of CVS. Also, in contrast to other studies, the present study did not establish any relationship between the sizes of screen used for working digitally and CVS [13].

The limitation of our study was the questionnaire based self-reported recording of the symptoms, making symptoms not recognized by users unreported. Due to the

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prevailing pandemic conditions, it was not possible to address uncorrected refractive errors and measure CVS clinically by ophthalmoscopy examination. Hence, it is recommended that the influence of uncorrected refractive error should be addressed methodologically and the measurement of CVS can be supported by ophthalmic examination in future studies.

Conclusion

As there is an exponential increase in digital screen usage in this work from home scenario and its wide prevalence of CVS reported even in the pre-COVID times, it still remains a poorly defined issue relative to its magnitude. In our study we found a high prevalence of CVS symptoms reported by the digitally working Indian population, with no gender preponderance, making it imperative to take a timely intervention to tackle this problem too. Although managing CVS requires a multidirectional approach, primary prevention still lies in creating awareness and providing health education regarding ergonomics and maintenance of ocular hygiene to individuals working digitally, which should be the focus in the current scenario of the pandemic.

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References

1. Porcar E, Pons AM, Lorente A. Visual and ocular effects from the use of flat-panel displays. *International Journal of Ophthalmology,* 2016; 9(6): 881-885.
2. Gangamma M, Rajagopala M. A clinical study on "computer vision syndrome" and its management with Triphala eye drops and Saptamrita Lauha. *AYU.* 2010; 31(2):236.
3. Zhao HL, Jiang J, Yu J, Xu HM. Role of short-wavelength filtering lenses in delaying myopia progression and amelioration of asthenopia in juveniles. *Int J Ophthalmol.* 2017; 10(8):1261-1267.
4. Hayes JR, Sheedy JE, Stelmack JA, Heaney CA. Computer use, symptoms, and quality of life. *Optom Vis Sci,* 2007; 84:738-744.
5. Sen A, Richardson S. A study of computer-related upper limb discomfort and computer vision syndrome. *J Hum Ergol (Tokyo),* 2007; 36:45-50.
6. Kim GH, Kim HI, Paik SS, Jung SW, Kang S, Kim IB. Functional and morphological evaluation of blue light-emitting diode-induced retinal degeneration in mice. *Graefes Arch Clin Exp Ophthalmol,* 2016; 254(4):705-716.
7. Bi WM, Sun K. Light-induced retinal damage, and potential benefits and side effects of blue light-filtering intraocular lens. *Recent Advances in Ophthalmology,* 2014; 34(3):289-293.
8. Zhao HL, Jiang J, Yu J, Xu HM. Role of short-wavelength filtering lenses in delaying myopia progression and amelioration of asthenopia in juveniles. *Int J Ophthalmol,* 2017; 10(8):1261-1267.
9. Zheng QX, Ren YP, Reinach PS, Xiao B, Lu HH, Zhu YR, Qu J, Chen W. Reactive oxygen species activated NLRP3 inflammasomes initiate inflammation in hyperosmolarity stressed human corneal epithelial cells and environment-induced dry eye patients. *Exp Eye Res.* 2015; 134:133-140.
10. Lee HS, Cui L, Li Y, Choi JS, Choi JH, Li ZR, Kim GE, Choi W, Yoon KC. Correction: influence of light-emitting diode-derived blue light overexposure on mouse ocular surface. *PLoS One.* 2016; 11(11): e0167671.
11. Seguí Mdel M, Cabrero-García J, Crespo A, Verdú J, Ronda E. A reliable and valid questionnaire was developed to measure computer vision syndrome at the workplace. *J Clin Epidemiol,* 2015; 68(6):662-673.
12. Bhanderi DJ, Choudhary S, Doshi VG. A community-based study of asthenopia in computer operators. *Indian J Ophthalmol.* 2008; 56(1):51-55.
13. The Vision Council. Eyes overexposed: The digital device dilemma: digital eye strain report. 2016. *https://www.thevisioncouncil.org/content/digital-eye-strain* (accessed 4/10/2020).
14. Dessie A, Adane F, Nega A, Wami SD, Chercos DH. Computer Vision Syndrome and Associated Factors among Computer Users in Debre Tabor Town, Northwest Ethiopia. *J Environ Public Health,* 2018; 4107590.
15. Akinbinu TR, Mashalla YJ. Impact of computer technology on health: Computer Vision Syndrome (CVS). *Medical Practice and Reviews,* 2014; 5(3):20-30.
16. Ranasinghe P, Wathurapatha, Perera Y et al. Computer vision syndrome among computer office workers in a developing country: an evaluation of prevalence and risk factors. *BMC Research Notes,* 2016; 9(1); 150-158.
17. Logaraj M, Madhupriya V and 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):179-185.

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18. Kozeis N. Impact of computer use on children's vision. *Hippokratia,* 2009; 13(4): 230-231.
19. Assefa NL, Weldemichael DZ, Alemu HW and Anbesse DH. Prevalence and associated factors of computer vision syndrome among bank workers in Gondar City, northwest Ethiopia. *Clinical Optometry,* 2017; 9:67-76.
20. Shantakumari N, Eldeeb R, Sreedharan J and Gopal K. Computer use and vision-related problems amongst students in Ajman UAE. *Headache,* 2012; 43(58): 53.
21. Noreen K, Batool Z, Fatima T and Zamir T. Prevalence of computer vision syndrome and its associated risk factors among undergraduate medical students. *Pakistan Journal of Ophthalmology,* 2016; 32(3):140-146.
22. American Optometric Association. Computer vision syndrome. 2017. *https://www.aoa.org/patients-and-public/caring-for-your-vision/protecting-your-vision/computer-vision-syndrome?sso=y* (accessed 5/10/20).
23. Levy BS. Preventing Occupational Disease and Injury. *American Public Health Association, Washington, DC, USA,* 2005.
24. Akms A, Alam S and Do M. Computer vision syndrome. *Ce ORION Medical Journal,* 2009; 32(3):692-693.
25. Zainuddin H and Isa MM. Effect of human and technology interaction: computer vision syndrome among administrative staff in a public university. *International Journal of Business, Humanities and Technology,* 2014; 4(3):38-44.
26. Chiemeke SC, Akhahowa AE, Akhahowa BO et al. Evaluation of vision-related problems amongst computer users: a case study of University of Benin. *Nigeria in Proceedings of the World Congress on Engineering, London, UK,* July 2007.

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