Computer vision syndrome among Gonda population: An evaluation of prevalence and risk factors

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ABSTRACT

Introduction - In the recent era of technological advancement, electronic devices have become an essential part of our lives, not merely in professional work settings, but also in everyday recreational activity. Although these devices have simplified our lives, they are associated with a wide variety of health complaints. Thus, the so-called computer vision syndrome (CVS) has become a growing public health problem and has gained significant attention as it plays an important role in the quality of life of each individual, which in turn has put an increased burden on the health care system. Extraocular symptoms have often been regarded as adding an additional load, even though eye problems are among the most commonly reported to ascertain the frequency of CVS and confirm the most popular linked.

Method - Regardless of socio-demographic characteristics, an electronic survey was dispersed at random via social media platforms to Gonda's general public from July to December 2022. The purpose of the survey was to determine the prevalence of CVS and confirm the most frequently identified risk factors.

Results - In total, 580 participants were involved in our study, with a mean age of 33.8 years. Of these, 77.6% suffer from CVS, with eye-burning being the most common ocular symptoms (71%), as well as itching (67.5%), blurred vision (65%), tearing (62.3%), and other eye symptoms being reported. Neck/shoulder pain was found to be the most prevalent extra ocular symptom (85.2%); also back pain and headache are frequently expressed (78% and 70% respectively). A significant positive correlation was observed between CVS symptoms and time spent using the devices.

Conclusion - As technology emerges, electronic gadgets are now a common tool employed for a variety of tasks on a regular basis. Our investigation revealed that the so-called "computer vision syndrome" is a developing public health issue. To prevent such health concerns, community education regarding the effects of such a lifestyle and appropriate management of electronic gadgets is necessary.

Keywords - Computer, electronic devices, mobile phone, neck pain, syndrome.
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INTRODUCTION

All age groups now use computers and other electronic devices (ED) for both professional and recreational purposes, making them a commonplace aspect of daily life. Laptops and portable touch screen devices, such smartphones and tablet PCs, that may be used anytime, anywhere, are examples of EDs that have proliferated. Moreover, millions of smart phone users are now carrying these EDs in their pockets. According to reports, the majority of smart phone owners are adults between the ages of 18 and 34. Subsequent research, however, revealed

that 87% of American youths between the ages of 14 and 18 own smart phones[2]. Computer vision syndrome (CVS) has received a lot of attention due to the obvious growth of technology and its prolonged and repetitive use, as it plays a crucial role in the quality of life of each individual, even though technology has made our lives easier in household work and also in offices.

CVS is a group of symptoms that include adverse effects on the eyes, musculoskeletal system, dermatological system, nervous system, and psychological that are linked to the use of various EDs.[3] It is estimated that the usage of EDs has caused roughly 60 million people globally to experience visual difficulties along with other symptoms. Every year, millions of new instances are reported.[4] The term "CVS" is misleading because extra ocular symptoms including shoulder and neck pain can also result from using electronic gadgets, in addition to the more common and less obvious visual side effects. As the most flexible portion of the vertebral column, the cervical spine might eventually become disabled by continuous aberrant neck alignment, such as bending the neck forward.

Symptoms documented by computer users are classified into ocular symptoms (strain, ache, dryness, irritation, and burning), visual symptoms (blur, double vision), and musculoskeletal symptoms (neck, shoulder, and back pain)[6].

The incidence of headaches has been noted to increase when the screen is viewed at a distance less than 50 cm, making this a major problem with the constant presence and usage of smartphones.[7] Though the
eye problems are the most frequently encountered complaint among its users, extra-ocular symptoms have their own concerns.[1] The continuous use of EDs may induce abnormal forward bending posture of the neck and damage proximate anatomical structures. It is reported that the neck flexion angle is greater with small-sized devices, thus increasing the stress on neck muscles.[8] Shoulder-arm-neck syndrome is mainly found in people who do repetitive work for more than six months.

The practice of specific subspecialties, such orthopedics and neurosurgery, is burdened by these extraocular avoidable symptoms. It is yet unknown if the discomfort brought on by using computers and other EDs will result in long-term harm. But it might also lead to a decrease in the precision and caliber of the job, which would lower production. The extent to which different types of ED are widely used for a variety of reasons necessitates taking the disorder's impact on the public into account. Thus, the study's objective is to evaluate the likelihood of experiencing symptoms associated with ED use as well as the prevalence of such symptoms.[10,9]

MATERIAL AND METHODS

A cross-sectional study was conducted among Gonda population. An online survey was distributed through social media platforms around the kingdom between the period from July to December 2022. All respondents who used computer, laptops or smartphones were included in the study.

Participants aged 15 years and above gave their consent after reading an explanation of the purpose and the aims of our study. The participants were surveyed using a pre-tested structured questionnaire, which included the basic demographic profile, hours of computer, laptops, and mobile phones usage per day. The study subjects were asked to report any eye or extraocular symptoms experienced while on the continuous use of computer and smartphones either at work or home. They were asked to mark whether they had experienced: none, mild (transient symptoms persist for few minutes to hours), moderate (persist for few hours and subsides after rest or sleep) or severe (needs medical consultation) visual problems during or after electronic device use.

Statistical data analysis was conducted using Statistical Package for Social Sciences (SPSS). Descriptive data were presented as percentages and unadjusted odds ratios (OR) to measure the strength of association and 95% confidence intervals (CI). The Chi-square test was applied to identify differences between the studied variables (such as the increase in hours of computer use), as well as simple frequency tables to establish the frequency distribution of the responses.

RESULTS

A sample size of 580 participants came from different regions in the country and had a mean age of 33.8 years (ranging from 14 to 65 years). The majority of the participants were females (68.7%). The respondents had different work statuses.

In total, 313 (45%) are using desktops at work, while 220 (31.8%) participants are using laptops. In comparison, at home, the number of laptops usage is greater than desktops with 79.2% and 8.8%, respectively. Regarding the light source used in the workplace, most of the participants (43.7%) have a fluorescent lightening type.

The two types of symptoms involving electronic gadgets that result from EDs are musculoskeletal and ocular symptoms. It was discovered that 77.1% of symptoms were associated with the use of visual display systems. There was little noticeable variation in the prevalence of symptoms among the respondents' various geographic locations, and there was only a weak correlation with educational attainment. Increased hours of ED use were shown to be significantly correlated with symptoms.

Data regarding the computers of the respondents is summarized in Table 2 and 3.

Table 1: Characteristics of the study population

	Frequency	Percent
Gender		
Male	216	31.3
Female	475	68.7
Age		
<25 years	225	
25-45	319	
>45	144	
Work		
Unemployed	124	18
Students	179	25.9
Teacher/Lecturer	78	11.3
Healthcare worker	65	9.4
Engineering	28	4.1
Retired	30	4.3
Others	186	27
Province		
Eastern	495	71.6
Central	76	11
Western	92	13.3
Northern	20	2.9
Southern	8	1.2

The frequency of each symptom connected to EDS is displayed in Graph 1. Symptoms of the eyes Participants were questioned regarding the frequency and severity of visual and ocular complaints. Strain, discomfort, dryness, irritation, burning, and double or blurred vision are examples of ocular and visual symptoms. According to the data gathered, the majority said they occasionally had somewhat significant visual and ocular problems. However, the majority of respondents stated that they had not experienced double vision, difficulties focusing for close vision, colored halos surrounding things, or sensitivity to light; the remaining respondents stated that they had encountered these symptoms less frequently. Of them, 69.9% reported having headaches, of which 75.8% had moderate-to-high intensity headaches. Table 4 summarizes the most frequent ocular symptoms reported.

Table 3: Number of working hours on electronic devices per day

Number of working hours/day	Frequency (%)		
	Computer at work	Computer at home	Handheld devices
1-3 h	255	395	240
			30+
4-6 h	169	120	245
>6	76	23	198

Participants were also asked to indicate how often they experienced musculoskeletal symptoms and headaches after using electronic devices. The most frequent musculoskeletal risk factors associated with the electronic devices syndrome are neck, shoulder, and back pain. Occasional shoulder and neck pain were found to be the most prevalent musculoskeletal symptoms that most participants experienced (50.2%). In addition, 44.9% reported having experienced occasional back pain. A significant correlation between increased hours of electronic devices usage and associated symptoms.

Table 4: Frequency and intensity of ocular symptoms

Ocular symptom	Frequency (%)			Intensity (%)		
	Never	Occasional	Always	Mild	Moderate	Intense
Eye burning	28.7	57.7	13.6		94.5	5.5
Itching	32.4	55.4	12.2		91.9	8.1
Foreign body sensation	66.1	29.2	4.6		93.6	6.4
Tearing	37.6	52.2	10.1		93.3	6.7
Excessive blinking	53	40.2	6.8		92.9	7.1
Eye redness	48.3	44.3	7.4		92.4	7.6

DISCUSSION

Effects of CVS can manifest themselves in many varied forms. These symptoms are linked to fatigue on the ocular, extraocular, and nervous systems of an individual as a result of excessive use of electronic devices, especially for very long hours.[6] According

to Shantakumari et al.,[7] the most prevalent visual problems associated with prolonged use of computers include eye burning sensation (54.8%), headaches (53.3%),and eye tiredness. The study's cross-sectional and longitudinal data sets broadly matched the prevalence of symptoms associated with VDU use and the associated risk variables. The results of this study corroborated their claim because the data showed a positive association between the two variables—the use of electronic devices and the frequency of symptoms associated with ED use.

Light emitted by the electronic devices result in retinal damage or eye discomfort, hence the prevalence of these symptoms.[13] This confirms the research done by Ranasinghe et al.,[3] who state that light from the VDUs create a glaring effect on eyes, and this effect often results in symptoms such as nearsightedness, eye fatigue, blurred vision, and dry eye, among other symptoms.

Our study did not address all the symptoms that result from prolonged use of digital devices. To clarify, regarding the discrepancies and gaps not addressed in the present study, future research in this field should be conducted for accounting the specific contextual and individual factors that influence the prevalence of the symptoms associated with EDs use.

The results of this study also support previous research by Shantakumari and his colleagues[7], which indicates that the kind of lighting present in electronic devices can result in "digital eye strain," a condition that can be either temporary or permanent depending on how much time and how frequently one uses the device. The symptoms of extraocular objects appeared to positively connect with extended use of technological gadgets. According to the investigation's findings, neck and shoulder pain were the most typical extraocular symptoms. Due to the constant forward leaning that occurs when using a smartphone, neck pain has been found to be the most common adverse effect.[14] Shoulder and neck pain is brought on by long hours and muscular weakness.

We found that CVS is a growing public health problem which is significantly associated with increased health related complaints and unpleasing symptoms that can dramatically compromise the quality of life of the affected individuals, causing an increased load on primary care centers. Primary care physicians are the first to deal with such complaints having a crucial role in risk assessment and disease prevention. Community education about the impact of such a lifestyle and its consequences on the health necessitates more efforts to increase the awareness for proper handling of electronic devices.

CONCLUSION

As technology advances, electronic devices have become a common tool that is used for different purposes on daily basis. We found in our study that the so-called computer vision syndrome (CVS) is a growing public health problem, resulting in variety of complaints and symptoms. Thus, preventive measures and community education about the burden of such lifestyle, and the proper handling of devices must be addressed.

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patients have given their consent for their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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