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Incidence of computer vision syndrome among students using digital gadgets

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Abstract:
Aim:
To detect the prevalence of computer vision syndrome among medical students.
Material and Methods:
This is a randomized questionnaire based study. In this study,50 students who were undergraduates and postgraduates participated.There are no specific restrictions to participate in this study.The questionnaire included demographic details excluding names for the anonymous data collection and included personal factors like the use of eyeglasses along with environmental variables.The main symptoms for CVS is categorized into two parts . They are Ocular symptoms and extraocular symptoms . Ocular symptoms include dry eyes,red eye,burning sensation, foreign body sensation , blurred vision and increased sensitivity to light ,excessive tearing,itching,ocular pain and double vision. Extra ocular symptoms include headache, neck,shoulder or back pain and numbness of the hands or fingers.
Results:
A total of 50 students participated in this study. Among them 26% were male and 74% were female.The highest working time using a computer is recorded as 3 to 6 hours per day. 92% of the participants took a break and only 8% of the participants took very less break while using a computer.The ocular and extraocular symptoms were taken into account .Among all the symptoms, headache was recorded with the highest percentage.The symptoms mostly experienced were blurred vision [23.4%],eye strain[57.4%],eye fatigue[40.4%],redness of eyes[14.9%],watery eyes[29.8%],dryness of eyes[34%],double vision[8.5%]eye irritation[21.3%]and burning sensation[31.9%].The least reported symptom was double vision with 8.5%.Those who take more than 20 minutes had better eye vision than those who took less than 20 minutes.
Conclusion:
Computer vision syndrome [CVS] is very common among undergraduate medical students,with excessive eye strain , tearing and headache are the most common symptoms.Inappropriate sitting position,working on the computer for more than 20 minutes without taking breaks were the factors independently associated with CVS. To avoid these problems eye awareness programs can be conducted and give them eye health education.
Keywords: *Digital display gadgets,eye strain,factors related to CVS*

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I. Introduction:

In this modern period , the use of computers has become an indispensable gadget to perform everyday tasks at work and home. This holds true regardless of the user's profession or occupation. The development of technology in education has made a noticeable transformation in the methods of teaching, presenting information and sources for learning. However , this convenient lifestyle still raised a health related concern [1-3] .Among the health related aspects is a condition known as computer vision syndrome. The American Optometric Association defined computer vision syndrome as " a complex of eye and vision problems related to near work experienced prolonged computer use. " [1] Globally, around 60 million computer workers experience discomfort from CVS [4]. Nearly 45 million workers use computers by staring at the screen for hours together [5]. A survey among American optometrists found that 14.25 % of patients who visited optometry clinics were suffering primarily from symptoms associated with computer usage [6]. Nowadays , university students including medical students are spending more time staring at the screen for studying and research work. There have been several studies reporting an increased prevalence of CVS among computer users, including medical students.[7] Computer vision syndrome is becoming more frequent in modern times due to the widespread use of portable digital terminals and lifestyles that depend on smartphones[8].

Electronic gadgets play a vital role in the society of this globalization era. From childhood,the trend of

using notebooks,tablets,smartphones and digital devices starting from video games to official work has become common.The computer usage , even for few hours per day, leads to various health ailments.Common visual symptoms of CVS includes eye strain , blurred vision,headache,dryness of eyes along with other complications like shoulder or neck pain on prolonged usage that generally increase in severity on prolonged use . Numerous studies were reported on the association between prolonged computer use , poor postures while using computers and various musculoskeletal discomforts , all these reports were based on western adult population[9].The study conducted in this area will show the magnitude and predictors of CVS and any technology managers and students with healthcare professionals can use this research for planning of reducing the risk of CVS[10].

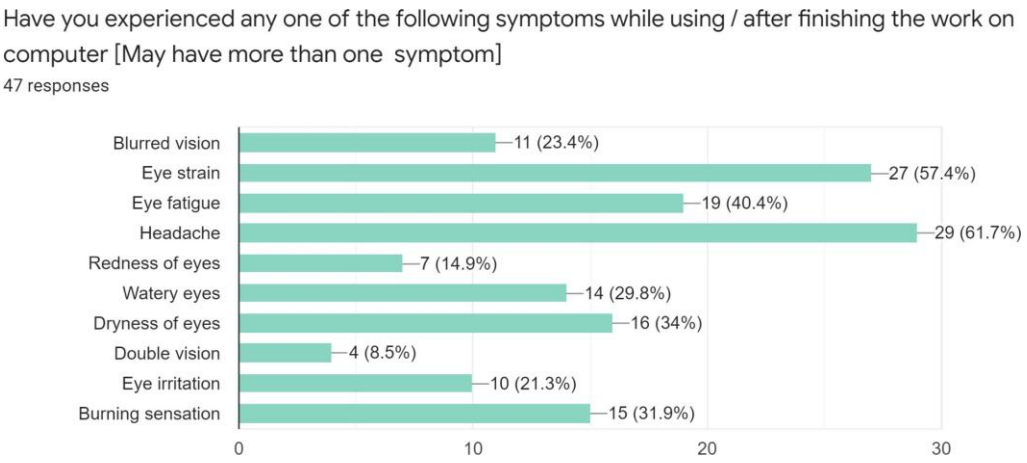
II. Methods:

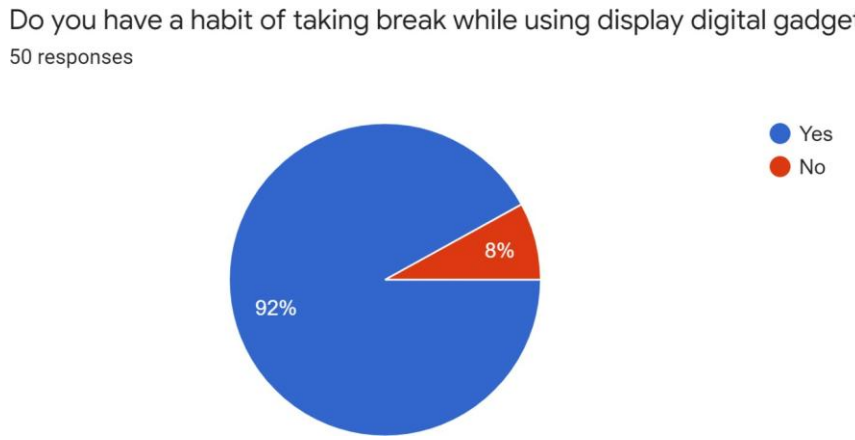
A cross sectional descriptive study conducted included 50 undergraduate and postgraduate medical methods from the first year to internship and third year postgraduate in Saveetha University,Thandalam, Chennai. There are no specific restrictions to participate in this study. The study was actually done by circulating online questionnaire forms created using the Google Docs. The questionnaire included demographic detail excluding names for the anonymous data collection , personal factors like using eye glasses and digital display gadgets and environmental variables.The main symptoms for CVS is categorized into two parts . They are Ocular symptoms and extraocular symptoms . Ocular symptoms include dry eyes,red eye,burning sensation, foreign body sensation , blurred vision and increased sensitivity to light

,excessive tearing,itching,ocular pain and double vision. Extra ocular symptoms include headache, neck,shoulder or back pain and numbness of the hands or fingers[11].The inclusion criteria were undergraduate and postgraduate medical and non medical students who use their laptops or tablets during studying for at least one month prior to the study. Data were analyzed using google forms.This was used to study the significance of CVS.Confidentiality of the information was maintained thoroughly by excluding names as identification in the questionnaire and keeping their privacy during data collection and also individual results were kept secure.

III. Results:

A total of 50 participants participated in the study.Among which 26% were male and 74% were female.The age ranged between 18 and 29 years. Almost everyone had one of the symptoms of CVS. The highest percentage acquired by the questionnaire is the head ache . The headache percentage is 61.7%. In association with the demographic detail in this study, the participants who are the age around 20 and 21 were most affected.The presence of refractive errors were not associated with the symptoms of CVS. But participants who wore glasses or spectacle were usually wearing glasses for their vision. In this study, it is recorded that 68% of people wore glasses and only 32% of people who participated didn't need glasses. According to the study, 71.8% of the participants are wearing it for vision and 28.2% are wearing it while using digital display gadgets.The highest working time using a computer is recorded as 3 to 6 hours per day. 92% of the participants took a break and only 8% of the participants took very less break while using a computer.The ocular and extraocular symptoms were taken into account .Among all the symptoms, headache was recorded with the highest percentage.The symptoms mostly experienced were blurred vision [23.4%],eye strain[57.4%],eye fatigue[40.4%],redness of eyes[14.9%],watery eyes[29.8%],dryness of eyes[34%],double vision[8.5%]eye irritation[21.3%]and burning sensation[31.9%].The least reported symptom was double vision with 8.5%.Those who take more than 20 minutes had better eye vision than those who took less than 20 minutes.





IV. Discussion:

This study was aimed to assess the incidence of computer vision syndrome while using digital display gadgets. The total of 50 students using computers can be a part of computer vision syndrome.With the help of the questionnaire which was given to the participants gave a detailed view of the computer vision syndrome. Refractive errors including myopia and hyperopia showed no significant association with CVS.Students who were known to have dry eye disease [15.3%] were associated significantly with CVS.This is in line of study carried out among Japanese office workers which concluded a significantly high prevalence of dry eye disease among video display terminal users[12]. This is explained by the reduced blinking reflex while seated in front of the screen for a long time,which contributes to improper tear production thus exaggerating dry eye disease[7].In some patients dryness is associated with systemic disease such as Sjogren's syndrome and rheumatoid arthritis[13].In another study among Spanish university students , the three symptoms with the highest frequency were headache,itching and heavy eyelid[14].In addition , prolonged staring at digital screens has been found in nearly in 20% of patients with computer vision syndrome[15].In a previous study ,participants reading on laptop computers at a distance of 50 cm for 30 min had a mean lag of 0.93D and increased ocular discomfort[16]. Besides, there is concern that the exposure to the radiofrequency electromagnetic field emitted from digital terminals.The most statistically significant risk factors were duration of studying, followed by distance from the screen and brightness of the screen.

Duration of studying using computers was the most significant risk factor,in which the longer time spent, the more prevalent and extent are symptoms.This findings is consistent with the findings of Hassan et al. and a report by the American Optometric Association[7]. Justification for higher prevalence of CVS among eyeglass wearers might be the spectacles were not prescribed by professionals,which resulted in either incorrect prescription or absence of glare or reflection protection surfaces[10].Furthermore,Noreen et al. reported that among CVS positive group , students who spent more than four hours were significantly at higher risk of CVS than who spent less than four hours[18].Strengthening the fact,Reddy et al. found a significantly higher CVS among students who used computers far more than two hours.It was also observed that the longer the duration, the longer the symptoms persist even after work[18]. In contrast,Hassan et al. found that taking short breaks every 30 minutes every hour decreases visual discomfort[7].Students who were not taking breaks at all during studying have associated significantly with watery eyes and neck , shoulder,or back pain[19].Nevertheless , the recommended viewing distance was suggested to be 20-28 inches by the American Optometric Association[1-3].A study carried out by Straker et al. found that musculoskeletal complaint gets worse by sitting posture[20].

V. Conclusion:

Computer vision syndrome [CVS] is very common among undergraduate medical students,with excessive eye strain , tearing and headache are the most common symptoms.Inappropriate sitting position,working on the computer for more than 20 minutes without taking breaks were the factors independently associated with CVS. To avoid these problems eye awareness programs can be conducted and give them eye health education.For those ,whose works are computer related they are expected to take breaks.The awareness program should include on how to use the digital display gadgets and the early awareness of the symptoms,treatment options and prevention strategies of CVS.

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