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Occurrence of Computer Vision Syndrome and Computer Related Practices among Medical Technology Students of Centro Escolar University

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Abstract:

*Context:*Technological advancements made individuals more reliant on digital gadgets in recent years and become an integral part of everyone's everyday lives, whether for work, entertainment, or school. Without a question, the widespread use of computers in schools from pre-school to post graduate school, companies, and homes has made life easier and improved job output significantly, but it has also resulted in several health risks which caused decline in the quality of life of computer workers.*Aims:* To determine the prevalence ofComputer Vision Syndrome (CVS) and computer relates practices among the Bachelor of Science in Medical Technology students of Centro Escolar University (CEU) located in its three campuses in the Philippines.

Methods: The data gathering was administered online through the use of survey questionnaires, which was validated and tested with a reliability result of 0.844 (GOOD).

*Results:*The Computer Vision Syndrome is moderately prevalent among the Medical Technology Students in Centro Escolar University. The student practices in using their gadgets is good. The literature reviews on computer ergonomics and practices in this study are mainly written in a pre-pandemic time where people are active and screens for digital learning does not include hand held phone yet and this study is written in during pandemic so it may be a factor that the respondents have already adapted the practice on taking a look at the screen of their digital device for so longand is used to in doing computer-related practices already. There is a significant relationship between the development of CVS and personal factors like frequent blinking and taking breaks but no significant relationship with the computer ergonomics.

Conclusion: CVS common symptoms like head ache, eye strain and muscle pain were moderately prevalent among the medical technology students in CEU. Staring at a computer screen for lengthy amounts of time can strain eye muscles, resulting in headaches, impaired vision, and eye fatigue.

Keywords:Computer Vision Syndrome, Digital Eye Strain, Computer Ergonomic Practices, Eye Strain, BS Medical Technology, Pandemic

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I. INTRODUCTION

Computer Vision Syndrome (CVS), collectively known as Digital Eye Strain (DES), is a condition that can occur when using computers and other devices with digital screens for prolonged periods of time. It is estimated that more than 50% of those who use computers are experiencing visual and ocular symptoms (Sheppard, 2018). This prolonged usage of gadgets might result in blurred vision or even eye irritation; further more are head ache, eye strain and muscle pain, which are some declared symptoms of CVS. It is also reported that approximately 14% of patients who does eye examination because of CVS and such affected individuals are not aware that they have the condition(American Optometric Association, 2019).

Several factors may lead to the development of the CVS like being too near when viewing the computer screen, having a bad angle of the screen to the eye level, and extended hours of usage during the day on a digital device. These problems are increasingly becoming more common especially for the students who need to meet the demands of their online classes especially in this pandemic season. CVS are commonly reported among health sciences students who tend to use different electronic devices. The amount of time spent in front of a digital screen appears to increase the discomfort level.

Penn Medicine Organization listed the most common symptoms of Computer vision Syndrome and these includes: Eye irritation (Dry eyes, itchy eyes, red eyes), Double vision and Blurred vision.Other symptoms reported are: Headaches, Muscle pains like Backaches, Neck aches, and Muscle fatigue

II. MATERIAL AND METHODS

This study employed a descriptive cross-sectional survey. A cross-sectional study looks at data from a group of people at the same time. In this type of study, participants are chosen based on certain variables of interest.The sample size was computed with the use of Slovin's formula, where the total population of BS Medical technologystudents enrolled in the three campuses of Centro Escolar University during the first semester of academic year 2020-2021 is 2,135 and computed with the confidence interval of 95%. The researchers then arrived with the sample size of 337. Simple random Technique was used initially which was followed by Snowball sampling technique to complete the target size.

The data gathering was administered through the online survey questionnaires and distributed to 337 from first year to third year BS Medical Technology students in the three CEU campuses. The researchers collected the response of students from the google forms with a modified survey questionnaire containing various questions about computer use plus CVS symptom-based questions that had been sent through their Gmail accounts and were subjected to scoring, analysis and interpretation.

The survey questionnaire was validated and approved by two licensed Optometrists and one Licensed Medical Technologist. A reliability test was followed and the computed Cronsbach alpha is0.844 which is verbally interpreted as good.

The survey tool is comprised of 4 parts.
Part I consists of the respondent's consent form participation.
Part II consists of the demographic profile: name (optional), age, year level, campus they belong to and their gender.
Part III is composed of a list of common symptoms of Computer Vision Syndrome and Digital Eye Strain in which the respondents have to choose how often they experience each of the common symptoms.
Part IV composed of questions about the respondent's personal factors and variables that may trigger CVS.

All of the questions are in a form 5-point Likert scale.

TABLE I. The range and interpretation of the five-point scale

Range	Interpretation
4.21 – 5.00	Always
3.41 - 4.20	Often
2.61 - 3.40	Sometimes
1.81 - 2.60	Rarely
1.00 - 1.80	Never

III. STATISTICAL ANALYSIS

The relationship between the symptoms of CVS and the personal factors and computer ergonomics, were determined using the Pearson Product-Moment Correlation Coefficient.

TABLE II. The range and interpretation of the correlation coefficients were shown in the table (Jackson, 2009).

Correlation Coefficient	Strengthof Relationship
± 0.70 – 1.00	Strong
± 0.30 – 0.69	Moderate
± 0.00 – 0.29	None (.00) to weak

To determine the prevalence of the symptoms of CVS among the respondents, the mean and standard deviation were assessed. Data were coded and processed using the Statistical Package for Social Sciences (SPSS).

IV. RESULTS AND DISCUSSIONS

Majority of the respondents are first year students aged 20-21 years old.

In pandemic time where everybody works at home and the only means of communication is by using the technology, in this study it showed that the students are **always**using the digital devices all throughout their studies and work with an average of four hours.

TABLE III. Mean and Verbal Interpretation Result of Usage Hours of the Students' Working and Studying.

	Mean	Verbal Interpretation
Usage digital device when studying/working	4.93±0.343	Always
Spending at least 4 hours or more in studying in front of digital device	4.79±0.519	Always

From the 16 symptoms of CVS that were identified in this study, 5 symptoms namely eye strain, headache, eye fatigue, neck or shoulder pain and back pain all falls under the often-experienced symptoms by the students. In these 5 symptoms, 3 symptoms were identified with the highest garnered mean, and these are: back pain, which has the highest accumulated mean of 4.09 followed by neck or shoulder pain which has a mean of 3.88 and headache with a mean of 3.64.

TABLE IV. CVS Common Symptoms Experienced by the Students

	Mean	Verbal Interpretation
Eye Strain	3.43 ± 1.264	Often
Headache	3.64 ± 1.083	Often
Eye Fatigue	3.55 ± 1.154	Often
Neck or shoulder Pain	3.88 ± 1.139	Often
Back Pain	4.09 ± 1.065	Often
Overall Mean: 3.24 ± 1.129		Moderately Prevalent

After calculating, its overall mean revealed 3.24 which means there is a moderate prevalence of CVS among the Medical Technology Students of Centro Escolar University from the three campuses.

The moderate prevalence of CVS through computed overall mean among the BS Medical Technology students may caused by their adaption

of the good habits and to the situation during the pandemic unlike in some of the related literature where the respondents developed severe CVS in pre-pandemic time

The personal practices that the researchers identified in this study are the habits of voluntary blinking and taking a rest. American Optometric Association stated that voluntary blinking and taking a rest were one of some important factors in preventing or reducing the symptoms of CVS. In this study, taking a break, with a mean of 3.85 was revealed as the personal measure that the students often practiced.

TABLE V. Mean and Verbal Interpretation of Personal Practices by the Students

	Mean	**Verbal Interpretation**
Habit of voluntary blinking	2.94±1.162	Sometimes
Taking a break while studying or using computer/digital device	3.85±1.032	Often

Take note that there are other personal preventive measures for Computer Vision Syndrome sufferers like: using an eyeglasses dedicated for computer users, using anti-glare on screen, and using an adjustable copyholder which mean one should place a reference materials at the same distance from eyes as the computer screen and as close to the screen as possible. That way the eyes would not have to change focus when looking from one to the other. Yet in this study, two factors were only used due to the insufficiency of resource materials and because of the limited time.

The Pearson's r coefficient and the 2-tailed test were used to examine the relationship between personal practices and the development of CVS. Between the two variables, there was a weak negative correlation (r = -0.296). Because the p-

value estimated using the 2-tailed test is less than 0.05, the result shows that there is a significant relationship between personal practices and the development of CVS.

TABLE VI. Significant relationship between Personal Factors and Development of CVS

		Personal Factors	**Development of CVS**
Personal Factors	Correlation	1.000	-0.0296
	Sig. (2-tailed)	-	0.000
	N	337	337
Development of CVS	Correlation	-0.296	1.000
	Sig. (2-tailed)	0.000	-
	N	337	337

For the most frequent computer ergonomics that were practiced by the students with a mean of 4.40 is matching the contrast of the computer or device with the surrounding brightness in terms of computer ergonomics.

TABLE VII. Computer Ergonomics' of the Students

	Mean	**Verbal Interpretation**
Device is below the level of seating position	2.99±1.288	Sometimes
Face is just in level to the digital screen and in correct distance	3.61±1.103	Often
Device's screen is above the level of my eyes	2.31±1.116	Rarely

Device's screen is at the level of my eyes	3.44±1.133	Often
Device screen is below the level of my eyes	3.30±1.156	Sometimes
Adjust the contrast of computer/device with the surrounding brightness	4.40±1.022	Always

The Pearson's r coefficient and 2-tailed test were used to examine the association between computer ergonomics and the development of CVS. Between the two variables, there was a weak positive association (r = 0.080). According to the findings, there is no significant relationship between computer ergonomics and CVS development. (p=0.0144).

TABLE VIII. *Significant relationship between Computer Ergonomics and Development of CVS*

		Computer Ergonomics	*Development of CVS*
Computer Ergonomics	Correlation	1.000	0.080
	Sig. (2-tailed)	-	0.144
	N	337	337
Development of CVS	Correlation	0.080	1.000
	Sig. (2-tailed)	0.144	-
	N	337	337

V. CONCLUSION

The present study revealed that computer Vision Syndrome is indeed moderately prevalent among the BS Medical Technology Students in Centro Escolar University from the three campuses in the Philippines.

There is a significant relationship between the development of CVS and personal factors like frequent voluntary blinking and taking a break but no significant relationship with the computer ergonomics.

Computers have become a popular tool in schools, colleges, universities, and businesses as a result of technological advancements and reliance on information technology. People at any age use digital devices for school, work and leisure especially during pandemic.

Students are shifted to online classes and adults are working from home which prolongs their time using devices. Students and teachers have online class the whole day, assignments and activities to check and answer, with all of these needs there are still several practices to be considered in order for everyone else to prevent CVS from occurring.

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