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Computer vision syndrome in teachers of a university of the province of Lima

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ABSTRACT

Virtual education has generated consequences at the visual level of people during the coronavirus pandemic since spending more time on the computer, it compromises the eye health of the person causing long-term visual problems, so its research objective is to determine the computer-related ophthalmic syndrome in teachers at a university of the province of Lima. It is a quantitative, non-experimental, descriptive, and cross-sectional study, with a total population of sixty-three teachers who answered a digital survey with socio-demographic data and the Computer Vision Syndrome Questionnaire (CVS-Q) instrument. In the results, we can observe the results of the computerized ophthalmic syndrome in teachers at a university in the province of Lima, where 51 (81%) of the teachers do not present computer vision syndrome, and 12 (19%) present computer vision syndrome. In conclusion, the population conducting virtual education should be educated as well as students about prevention measures for computer ophthalmic syndrome and its consequences.

1. Introduction

Worldwide, after the outbreak of the coronavirus disease (COVID-19), the general population was concerned because the long-term effects that the pandemic can generate can be considered high risk to health and this may affect the youngest since they are not yet prepared to face this situation (Sarkar et al., 2021).

Although not only health is compromised, the educational system was drastically compromised, many researchers argue that face-to-face teaching is uncertain, because social distancing during the pandemic (Dhawan, 2020), will have negative effects on the learning of young people, and this will allow schools to seek options that face this difficult situation and can continue educating young people (Saha et al., 2021).

Likewise, many of the countries closed their study houses to avoid the spread of the virus in their younger population (Sun et al., 2020), and due to this, they decided to carry out distance education through digital platforms to provide an education that is still of quality until the COVID-19 pandemic has subsided (Al Tawil et al., 2020).

At present, the educational system in the last decades has advanced considerably, and that has been demonstrated to be immensely useful during the COVID-19 pandemic (Wang et al., 2021) since with the support of digital platforms, it still allows education that was stocked by this disease (Chakraborty et al., 2021).

However, online education has had its consequences, since spending so much time on the computer has generated complications at the eye level (Moldovan et al., 2020), such as eye diseases, sleep disorders, and inadequate posture, not only for students, but also for teachers, and the general population (Faizi and Kazmi, 2017; Saldanha et al., 2021).

For this reason, eye health will be compromised during the COVID-19 pandemic, since this was done to be able to continue with the education of young people, although with the passage of time many risks have been seen that can cause and that can even

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generate a loss of vision if it is not prevented (Toh et al., 2020).

In a study conducted in India (Ganne et al., 2021), with 941 participants among university teachers, students, and the general population, the prevalence of visual fatigue was higher in university students 50.6% than in teachers and the general population 33.2% and therefore university students tended to be at high risk for computer vision syndrome.

In a study carried out in Saudi Arabia (Zalat et al., 2022), with the participation of University personnel, they observed that 81.2% of them tended to present computer vision syndrome and that 52.3% were female where they presented a higher index to present the disease; and the main symptoms they presented were dry eyes, headache, short vision and difficulty concentrating.

In a study carried out in Egypt (Zayed et al., 2021), with the participation of University personnel who worked in the area of technological information, it was observed that 82.41% of the personnel, in general, tended to present the syndrome of computer vision and in terms of the symptoms, 81.5% presented headache, 75.9% ocular burning and 70.4% blurred vision.

Therefore, the objective of the research is to determine computer-related ophthalmic syndrome in teachers at a university in the province of Lima.

2. Methodology

2.1. Research type and design

The research is quantitative, in terms of its methodology it is descriptive, not experimental, and cross-sectional (Fernández and Baptista, 2014).

2.2. Population and sample

The total population is made up of 63 teachers who work in a university center in the province of Lima.

2.3. Inclusion criteria

- Teachers who work more than 2 to 3 years at the University.
- Teachers who have voluntarily agreed to participate in the study.
- Teachers who work using the computer for their virtual classes.

2.4. Technique and instrument

A digital survey was conducted through Google form, in which the Computer Vision Syndrome Questionnaire (CVS-Q) instrument was used.

For data collection, it is done as follows: First, the sociodemographic aspects of age, if you are a user of glasses and time on the computer; Second, the CVS-Q, which comprises 16 items distributed in 2 dimensions, of which the items are the same for both dimensions, and which determine the frequency and intensity of the symptoms at the ocular level; for the frequency of symptoms dimension, it is assessed with a Likert-type scale with 3 response options where: “1=Never,” “2=Occasionally,” and “3=Often”; in the dimension intensity of the symptoms, it is assessed with a Likert-type scale with 2 response options where: “1=Moderate” and “2=Severe”; the higher the score, the presence of computer vision syndrome will be evidenced in university teachers (del Mar Seguí et al., 2015).

The validity of the instrument to determine computer vision syndrome was performed with the Kaiser-Mayer-Olkin sample adequacy measure, obtaining a coefficient of 0.802 (KMO>0.5), while Bartlett's sphericity test obtained significant results (X^2 approx.=580.816; gl=120; p=0.000).

The reliability of the instrument was determined based on Cronbach's Alpha statistical test, the same one that was obtained for all the items (i=16) a coefficient of 0.904 (α>0.8).

2.5. Place and application of the instrument

The digital survey was conducted through computers and cell phones where surveys could be conducted, which will determine if there is a presence of computer vision syndrome in university teachers in the province of Lima. First, we coordinated with the university professors so that they could be voluntarily present in the research study, and they were guided about the study that is being conducted. After guiding the teachers, the virtual surveys were conducted taking a time of 15 min for each teacher, at the end of the surveys it was very satisfactory since the teachers were very accessible to be in the study and to be able to detail the results in the research work.

3. Results

In Fig. 1, we can see the results of Computer Vision Syndrome in university teachers of the province of Lima, where 51 (81%) of teachers do not have computer vision syndrome and 12 (19%) present computer vision syndrome. Fig. 2 shows the results regarding the frequency of symptoms in teachers, where 38 (60.3%) of teachers present a low frequency of symptoms of the computerized ophthalmic syndrome, 22 (34.9%) a medium frequency of symptoms, and 3 (4.8%) a high frequency of symptoms. In Fig. 3, we observe that 62 (98.4%) of the teachers present a low intensity of the symptoms of Computer Vision Syndrome and 1 (1.6%) a medium intensity of the symptoms of Computer Vision Syndrome.

Table 1 lists the computer vision syndrome and whether the university teacher is a lens user which was determined with Pearson's chi-square test (X^2). The level of significance of the test obtained a value of 3.62 (p>0.05) (X^2=0.187; d.f=1). Therefore, we can interpret that 35 (79.5%) of the teachers who are lenses user do not have computer vision syndrome

and 9 (20.5%) do have computer vision syndrome; 16 (84.2%) of teachers who are not lenses user do not have computer vision syndrome and 3 (15.8%) of teachers who are not lenses user do have computer vision syndrome.

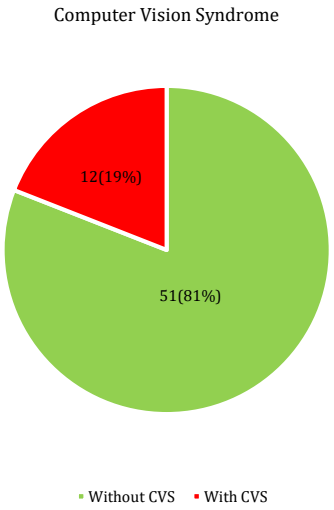

Fig. 1: Computer vision syndrome in the university teachers of a university in the province of Lima

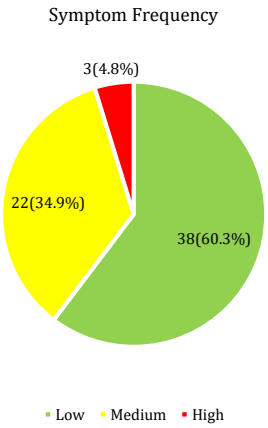

Fig. 2: Computer vision syndrome in its dimension frequency of symptoms in university teachers of the province of Lima

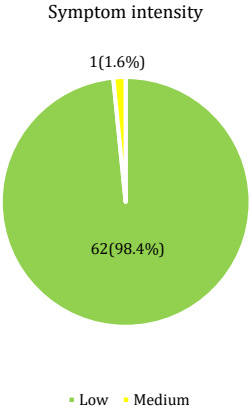

Fig. 3: Computer vision syndrome in its dimension intensity of symptoms in university teachers of the province of Lima

Table 2 lists the computer vision syndrome and how long the teacher is at the computer, which was determined with Pearson's chi-square test (X^2). The level of significance of the test obtained a value of 1.14 ($p>0.05$) ($X^2=1.486$; d.f=2). Therefore, we can interpret that, of the teachers who are on the computer for 2 to 4 hours, 5 (83.3%) do not present the computer vision syndrome and 1 (16.7%) do; after 4 to 8 hours, 26 (86.7%) did not present computer vision syndrome and 4 (13.3%) did; more than 6 hours on the computer, 20 (74.1%) did not present computer vision syndrome and 7 (25.09%) did.

Table 3 lists the computer vision syndrome and whether the teacher has any visual disease, which was determined with Pearson's chi-square test (X^2). The significance level of the test obtained a value of 0.19 ($p>0.05$) ($X^2=2.487$; d.f=4). Therefore, it can be interpreted that teachers with astigmatism 14 (82.4%) do not have computer vision syndrome, 3 (17.6%) do, and teachers with myopia, 8 (66.7%) do not present computer vision syndrome, 4 (33.3%) do, teachers with hypermetropia 1 (100%) do not present computer vision syndrome, teachers with cataract, 2 (100%) do not present computer vision syndrome and teachers with no disease, 26 (83.9%) do not present computer vision syndrome and 5 (16.1%) do.

4. Discussion

Computer vision syndrome is one of the conditions that, due to the current situation due to the COVID-19 pandemic and the educational measures promoted by various universities in order that their students do not get infected, but nowadays, as virtual classes are in a normalized way, it leads anyone to have high exposure to electronic devices where they carry out their work, and this considerably affects their eye health, generating discomfort and visual alterations, damaging their well-being in their health.

The prevalence of computer vision syndrome found in the study has been low as well as in its dimensions, this is due to the fact that the teachers are well at the level of their ocular health, and this allows future problems that can lead to continuing with virtual classes, since not all teachers handle technology, so virtual classes are increasingly being carried out by capable young teachers who can handle it and who can also improve virtual education, although, when it is younger the higher the prevalence, the syndrome will develop in the long term.

In Ganne et al. (2021), they argued that eye problems are due to the fact that people's predisposing time is so high that they generate the frequent symptoms of all ocular problems such as headache, dizziness, and constant blinking.

Table 1: Computer vision syndrome in relation to whether the university teacher is a lenses user of a university in the province of Lima

			Computer vision syndrome		Total
			without CSV	with CSV	
Are you a lens user?	Yes	Count	35	9	44
		% Within Are you a lens user?	79.5%	20.5%	100.0%
	No	Count	16	3	19
		% Within Are you a lens user?	84.2%	15.8%	100.0%
Total		Count	51	12	63
		% Within Are you a lens user?	81.0%	19.0%	100.0%

Chi-square tests

	Value	df	Asymptotic significance (bilateral)	Exact significance (two-sided)	Exact significance (one-sided)
Pearson's Chi-square	.187[a]	1	.665		
Continuity correction[b]	.007	1	.934		
Likelihood ratio	.193	1	.661		
Fisher's exact test				1.000	.479
Linear by linear association	.184	1	.668		
N° of valid cases	63				

a. 1 cell (25.0%) has expected a count of less than 5. The minimum expected count is 3.62; b. It has only been calculated for a two-by-two table

Table 2: Computer vision syndrome in relation to how long the university teacher of a university of the province of Lima on the computer

			Computer vision syndrome		Total
			without CSV	with CSV	
How long is it on the computer?	2 to 4 hours	Count	5	1	6
		% Within How long is it on the computer?	83.3%	16.7%	100.0%
	4 to 8 hours	Count	26	4	30
		% Within How long is it on the computer?	86.7%	13.3%	100.0%
	More than 6 hours	Count	20	7	27
		% Within How long is it on the computer?	74.1%	25.9%	100.0%
Total		Count	51	12	63
		% Within How long is it on the computer?	81.0%	19.0%	100.0%

Chi-square tests

	Value	**df**	**Asymptotic significance (bilateral)**
Pearson's Chi-square	1.486[a]	2	.476
Likelihood ratio	1.481	2	.477
Linear by linear association	.982	1	.322
N° of valid cases	63		

a. 2 cells (33.3%) have expected a count of less than 5. The minimum expected count is 1.14

Table 3: Computer vision syndrome in relation to if the university teacher of the province of Lima has any visual disease

			Computer vision syndrome		Total
			without CVS	with CVS	
Do you have any visual disease?	Astigmatism	Count	14	3	17
		% Within, do you have any visual disease?	82.4%	17.6%	100.0%
	Myopia	Count	8	4	12
		% Within, do you have any visual disease?	66.7%	33.3%	100.0%
	Farsightedness	Count	1	0	1
		% Within, do you have any visual disease?	100.0%	0.0%	100.0%
	Cataract	Count	2	0	2
		% Within, do you have any visual disease?	100.0%	0.0%	100.0%
	No disease	Count	26	5	31
		% Within, do you have any visual disease?	83.9%	16.1%	100.0%
Total		Count	51	12	63
		% Within, do you have any visual disease?	81.0%	19.0%	100.0%

Chi-square tests

	Value	**df**	**Asymptotic significance (bilateral)**
Pearson's Chi-square	2.487[a]	4	.647
Likelihood ratio	2.839	4	.585
Linear by linear association	.371	1	.542
N° of valid cases	63		

a. 6 cells (60.0%) have expected a count of less than 5. The minimum expected count is .19

As for the teachers who spend more time at the computer, it is observed that the majority of teachers who spend from 2 to more than 6 hours on the computer do not have computer vision syndrome,

this is due to the fact that teachers who, above all, young people used preventive measures such as eye massages, gaze away from the screen and the use of artificial tears, allowed a lower incidence of computer vision syndrome and that this allowed to continue to carry out virtual education for a longer time. In Zayed et al. (2021), they argued that as the teacher performs more time in virtual education there is a risk that they will present computer vision syndrome, since by spending a long time in front of electronic devices to work, the frequency of blinking, the production of tear secretion and leading to evaporation causing the symptoms of the syndrome.

Regarding the results of the presence of some visual disease and ophthalmic syndrome, we see that the majority do not present computer vision syndrome, although these visual alterations compromise ocular health in terms of focus and generate a visual effort of the person causing different ocular and visual discomfort. In Zalat et al. (2022), they argued that diseases such as astigmatism, myopia among others, are those that compromise the eye health of the person, generating computer vision syndrome, since the effort they make to be able to do their work, makes more difficult and allows us to see the risks that they can generate, such as constant eye fatigue, difficulty in seeing and loss of vision in one or both eyes.

5. Conclusion

The population that conducts the virtual education as well as the students should be educated about the prevention measures for computer vision syndrome and its consequences. Strategies should be implemented that allow the prevention of computer vision syndrome and thus be able to maintain stable eye health. The younger population should be made aware of why electronic devices should be used for less time and their risks to eye health.

Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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